SURVEY OF HEALTH PROBLEMS *and* FACILITIES

—IN—

MEMPHIS AND SHELBY COUNTY, TENNESSEE

FOR THE YEAR 1929

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MADE FOR THE

Committee on Administrative Practice

OF THE

American Public Health Association

BY

W. F. Walker, Dr. P. H., Secretary
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November 19, 1930.

Dr. J. B. McElroy, Chairman,
Executive Health Survey Committee,
Memphis, Tenn.

My Dear Dr. McElroy:

I herewith transmit a report of the survey of public health problems and facilities in Memphis and Shelby County, Tennessee, undertaken at the request of your Committee in December, 1929, and carried on by the staff of the Committee on Administrative Practice of the American Public Health Association.

Early in the study it was apparent that Memphis, because of its hospital facilities, experienced an abnormally high death rate (21.8 per cent of all deaths are non-residents; 33 per cent of all white deaths are non-residents). For this reason the basic vital statistics used in the survey have been, so far as possible, corrected for residence.

The differences in the nature of the problems confronting the white and colored people in the community have been emphasized by using this classification for the major items of mortality, morbidity and service.

In the presentation of the factual material and the formulation of the recommendations, we have attempted to lay a sound basis for a community health program to cover a period of several years. In so doing, we have been particularly impressed by certain facts which seem worthy of general consideration.

1. Memphis has experienced a struggle against disease far more difficult than most American cities. That the city has in the past adequately met these almost overwhelming obstacles is the best guarantee that the present needs will be provided for.
2. There are on every hand evidences of a co-operation between the workers of official and non-official agencies of both the city and county quite above the average which should greatly simplify the carrying out of many of the detail recommendations of the study.
3. Memphis, unlike many American cities, has financed its public health work almost entirely through taxation. (Only 13 cents of the 92 cents per capita spent in 1929 came from non-official agencies.) The city is to be congratulated for this forward looking attitude in assuming the responsibility for health work and should be encouraged to increase expenditures in this field until public health service is as adequately developed as are its services for fire or police protection or for education.
4. The health of colored people in the city and county should be a major consideration in the development of the future program. The death rate in recent years of negroes is 2.1 points higher than the birth rate, while the birth rate among the white group (though but 80 per cent of the negro rate) is 8 points higher than the death rate.

5. Tuberculosis remains one of the major problems of disease control in Memphis. It ranks fifth as a cause of death among white residents and is the major cause of mortality among negroes, the death rate among negroes being more than five times the rate among white residents.
6. The organization of community facilities to adequately cope with the tuberculosis problem is one of the principal needs of public health work. To this end a division of tuberculosis control should be created in the city health department, and the Shelby County Tuberculosis Society should devote its resources particularly to the education of the public in those general hygienic measures which tend to prevent tuberculosis and to services for early diagnosis and the care of sub-standard children.

I desire to express the appreciation of the survey staff for the most hearty co-operation and assistance rendered by members of the staff of the county and city health departments in the collection of factual material, and for the personal interest and efforts in behalf of the survey of Drs. Price, Graves and Moore, and to the Chairman and members of the several committees for their guidance and advice in formulating the recommendations.

Particular mention should be made of the contribution by the staff of the state department of health in the compilation of vital statistics and of the wise counsel and advice of Dr. E. L. Bishop, State Commissioner of Health.

Respectfully yours,

W. F. WALKER, Dr. P. H.,
Secretary.

INTRODUCTION

The Growth of the City.

When an act of the Tennessee General Assembly made Memphis a city in 1826, its history extended back to the fifteenth century. The fortress of the Chickasaw Indians, located on the lower bluff which was to become the site of Memphis, was seen by Ferdinand DeSoto in 1541. The Chickasaw was a virile tribe, which kept possession of its fortress for 132 years after DeSoto's visit. In 1682, Sieur Robert Cavelier de la Salle claimed the Mississippi Valley between the Allegheny and the Rocky Mountains for Louis XIV of France, naming the territory "Louisiana." It then became the desire of the French Governors of Louisiana to drive out the Chickasaws, and, particularly, to take possession of the fortress of the Chickasaws on the lower bluff. But they were defeated by the Chickasaws, who continued to hold this land until the early nineteenth century.

The Peace of Paris, by which France ceded to England all of Canada and the land east of the Mississippi in 1763, marked the beginning of the settlement of the Mississippi Valley by the English and Americans. The settlement was accomplished without bloodshed, as the Chickasaws were of more friendly disposition toward the English and Americans than they had been toward the French.

In 1796, the state of Tennessee was admitted to the Union. With the other states of the "new west," it underwent rapid development due to the emigration from the seaboard states which followed the war of 1812.

An early act of the General Assembly of Tennessee was the creation in 1826 of the city of Memphis, which, at this time, had a population of 500. That the characteristics of the pioneers of the "new west" were reflected in its settlers is indicated by its phenomenal growth to a city of over 250,000 population scarcely more than 100 years later.

But the growth of the city was not accomplished without struggle against forces both within and external to itself. In the first 25 years of its history, "sectional jealousies did much to retard progress . . . . Jealousy was displayed between some of the leading citizens; it was much in evidence between sections of the city; rival towns sprang up; and even the state was charged with slighting the western city."* In 1849, North and South Memphis were incorporated as one city, thus ending the sectional jealousy which had been so disrupting to the city's unity. More destructive to progress than this internal discord was the city's defense-

(*) Young, John Preston. Standard History of Memphis, Tennessee. H. W. Crew & Co., Knoxville, Tennessee, 1912.

lessness from epidemics of smallpox, yellow fever and cholera. In 1873, the combined effects of epidemics of smallpox, cholera and yellow fever reduced the population by more than 5,000, including those who died in the epidemics, or left the city to escape them. In 1878, the yellow fever epidemic, described as "the horror of the century," resulted in the loss of 5,000 of the population by death, and an additional 5,000 by emigration. So serious was the disorganization following this epidemic that the city gave up its charter and became a taxing district under the jurisdiction of the state of Tennessee, its name not being restored until 1891, and the privilege of levying and collecting taxes withheld until 1903. An important compensatory result of the epidemic was the appointment of the board of health, in which was centered the responsibility for preventing the recurrence of future epidemics by the institution of public health measures.

The occurrence of the epidemic of 1878 demonstrated to the city the importance of health protection as an economic measure. It resulted in the creation of a board of health authorized to secure needed health protection for the community. The success with which this aim has been accomplished is expressed in both the health and economic status of Memphis. The epidemic diseases, cholera, yellow fever and smallpox, which retarded its development in the nineteenth century, have been wiped out. Typhoid fever and malaria have been greatly reduced. Coincident with this improvement in health conditions there has occurred an increase in prosperity. The modern Memphis, "the largest inland cotton market in the world," the "greatest nonproducing center of steel in America," the "largest hardwood manufacturing center in the world," has been built on foundations laid in the nineteenth century. Among these foundations, the most notable is the achievement of the city in its conquest of preventable disease, which forecasts its power to futher extend its public health program.

The Characteristics of the Present City.

Memphis is an important railroad transportation center of the south, and is rapidly becoming a strategic point in the inland waterway system connecting the Great Lakes and the Gulf of Mexico. Its advantageous transportation facilities have transformed it from a center of pre-eminence in cotton production and marketing to a city of diversified industrial and agricultural interests. Its rise in industrial development, which has taken place largely since 1928, has been stimulated by the efforts of the local chamber of commerce.

Its most important raw products are cotton, cottonseed

oil, mixed feed and lumber. Through the development of the inland waterway system, it is becoming an important non-producing center of steel. The extent of its industrial development may be judged from the number of its industrial establishments, which number 556, with approximately 30,000 employes. Its products are valued at $210,000,000 annually.

Memphis is important also as a retail market for several of the surrounding states.

The assessed valuation of the city was reported to be $235,915,406 in 1929; this figure represents 67 per cent of the true value.

The average annual mean temperature of Memphis from 1872 to 1930, inc., was 61.7 degrees F. While its period of high temperature is comparatively long, its winter temperature is mild. The altitude of the city is 274 feet above sea level. Both the city of Memphis and the country surrounding are flat. Its nearness to the Mississippi river makes it subject to inundation at time of floods. Of more frequent occurrence is the overflow of the Wolf river, a tributary entering the Mississippi river north of Memphis, which makes drainage of low areas of the city in the region of Wolf river an engineering problem of constant importance.

The environment of Memphis is, on the whole, favorable, and offers few health problems with the exception of its low areas which favor the breeding of the malarial mosquito. It is significant that the malaria control activities of the Memphis health department are very completely organized to meet this problem.

The History of the Board of Health.

In 1879, when the Memphis board of health was established, practice in the control of the diseases now known to be infectious was based on imperfect knowledge of their cause. Epidemics of yellow fever were controlled by quarantine laws based on the assumption that yellow fever was spread both by persons, sick and well, and by goods from infected areas. Malaria control consisted of drainage of areas containing stagnant water. In his fifth annual report, the president of the board of health recommended the drainage of the holes in the bed of the Bayou Gayoso, because of his belief that "the miasma arising from these offensive pools cause malarial fevers of a very intractible type." In both cases, the control measures in use contributed to the prevention of these diseases, but they were only partially successful since they were based on the belief that disease originated in the environment. It was only after the germ theory of disease was demonstrated by Pasteur, and the European bacteriologists discovered the cause and mode of

transmission of many of the infectious diseases, that their scientific control was possible. These discoveries were made in the period 1880-1900. Thus, the early history of public health in Memphis is of particular interest as it reflects the evolution of knowledge of the control of disease which was taking place in the country as a whole.

The limited scope of public health work in Memphis in this early period is comprehensible on this basis. The president of the board of health, in an early report† stated that "the three essentials to the perfection of the sanitary work of Memphis, are: The completion of the sewer system as originally designed, the substitution of Mississippi for Wolf river water, and the treatment of Bayou Gayoso . . . . ". To these essential aims were soon added garbage service, under the immediate supervision of the health officer, and house to house inspection, performed by "sanitary police." With occasional public vaccinations against smallpox, these activities comprised the public health program of the Memphis board of health in its early years.

The problem of water supply was solved in 1888 by the construction of artesian wells. The sewerage system was not completed until about ten years later. As these fundamental sanitary needs were met, other measures designed to prevent disease were introduced. In 1890, the president of the board of health noted the large number of deaths from typhoid fever and diphtheria, which he attributed to "three causes: the milk supply, the water supply, and defective plumbing and ventilation." In accordance with this belief, the appointment of a milk inspector was recommended, and a plumbing inspector was added to the staff. The increasing definition of the field of public health is indicated by the fact that while the plumbing inspector made annual reports to the board of health, he was connected officially with the sewer department. While a milk inspector was not added to the staff until 1900, the duties of milk inspection were assumed by the health officer and sanitary police in 1894, and a program of milk control was slowly developed.

The president of the board of health, in his annual report for the year 1894, made the wise observation that "the true measure of the health of a place is determined as much by health rate as by death rate." Yet the course of mortality was carefully watched. It was observed very early that the mortality rate was increased by deaths of nonresidents occurring in the city. Thus, in 1884, the death rate

(†) Thornton, G. B., M. D., President. Fifth Annual Report of the Board of Health of the Taxing District of Shelby County, (City of Memphis), for the year 1883. Memphis, Tennessee. 1884.

from all causes per 1,000 population, including residents and non-residents, was 26.9; this rate was reduced to 19.3 when the deaths of non-residents were excluded. It was found that the death rate of the colored population greatly exceeded that of the white population; in 1884, the death rate from all causes per 1,000 resident white population was 11.7, and per 1,000 resident colored population, 33.3. The leading causes of death in each year of the period 1879 to 1894 were "consumption, malarial fevers, bowel affections and pneumonia"‡.

The importance of complete registration of births was also recognized, although birth registration was not a general practice. In 1890, the president of the board of health recommended "that the state legislature be memorialized with a view to securing the passage of a law requiring the registering of all births."

In 1898, the position of bacteriologist was created and filled, and a laboratory was established. At this time, an effort was made to improve the control of communicable disease by making certain diseases reportable. The secretary of the board made the following request in his annual report of 1898: "In regard to contagious diseases, I would respectfully ask that at an early meeting of our board you would entertain a motion to make the following diseases reportable: tuberculosis, typhoid fever, measles and tetanus. I do not ask this with the intention of placarding the houses, but that we may keep an accurate contagious disease record, and where necessary, disinfect the premises."

Smallpox control was improved by the passage of an ordinance in 1899, by which vaccination was made practically compulsory.

In the decade 1900-1910, there occurred a gradual expansion of the activities of the Memphis board of health. In 1902, one of the sanitary inspectors was designated as a contagious disease inspector, another as a dairy inspector. In 1903, a food inspector was appointed. Medical inspection of schools was first proposed by the president of the board of health in 1906, but was rejected by the school board. In his annual report of 1907, the president stated: " . . . . I predict that in five years' time there will be no more objection to this inspection than there is now to the inspection of schools for evidence of successful vaccination . . . . " And his prediction became reality within this period, medical inspection having been introduced in the public schools of Memphis in March, 1909.

(‡) Thornton, G. B., M. D., President. Sixteenth Annual Report of the Board of Health of the City of Memphis, for the year 1894. Memphis, Tennessee. 1895.

In 1909, the present form of public health organization of the city of Memphis was introduced by the provision of the commission form of local government. The mayor became commissioner of health, which office gave him "general supervision over the office of superintendent of health and matters relating thereto, including the city hospital, the veterinary surgeon, and all matters properly pertaining to said department." The board of health, established in 1879, was abolished also in 1909, and in lieu thereof was established a "subordinate department to be known as the health department, to be under the supervision and control of the department of public affairs, which said department shall perform the duties and functions heretofore performed by the board of health"§. The act of 1909 provided for the appointment of the superintendent of health by the board of commissioners, for a term of two years; the superintendent of health was designated as the executive officer of the department. The original board of health had included the offices of secretary and health officer, which were retained in the new department of health.

With this reorganization came a separation of the functions of the staff of the department of health by the creation of the division of sanitary inspection, chemistry and bacteriology, contagious diseases, school inspection and the dairy division. The food and meat inspectors were subordinate to the division of chemistry and bacteriology.

In 1911, a staff of four white visiting nurses and one colored nurse was added to the health department. In the summer of this year a milk dispensary was established by the health department, with the assistance of a fund obtained by public subscription. The visiting nurses supervised the work of the dispensary, giving instruction in the modification of milk for infant feeding, and dispensing free milk to the indigent. These nurses also did some instructive visiting nursing. This program was abandoned in 1912, and the health department appointed four school nurses to supplement the work of the school medical inspectors, of whom there were 17 in this year. By 1917, school nursing had superseded school medical inspection, the staff of school nurses having been increased to 11 white and two colored nurses, and the staff of school medical inspectors reduced to one, the chief medical inspector.

In March, 1920, the office of chief medical inspector of schools was discontinued.

In addition to their school nursing activities, the school nurses made visits to cases of communicable diseases, including tuberculosis. Their program included no prenatal

(§) Senate Bill 574, ch. 298, section 5. 1909

or infant welfare nursing, with the exception of a limited amount of instruction given at the milk stations, opened in 1918. The only prenatal and infant nursing service available in the city was that of the Public Health Nursing Association, which was also subsidized by the city to give bedside care to its indigent sick. The Associated Charities also received financial grants from the city for bedside nursing service to the indigent.

In 1923, the nursing staff of these two non-official agencies was taken over by the Memphis General hospital, and two years later this nursing service was transferred to the supervision of the Memphis health department. From this date, the development of the public health nursing service of the health department has been rapid. The former specialized type of nursing service has been replaced by a generalized service. The medical and nursing services for maternity and childhood have been co-ordinated under the division of child hygiene, established in 1921. A broad public health nursing program has been introduced, and its results demonstrate the advantage of centralization of the nursing service in the health department.

The present decade has seen the reorganization of the Memphis health department to provide adequate health service for the individual. Until 1920, the major emphasis of the public health work in Memphis had been placed on sanitation, food and milk control, laboratories, and the control of communicable disease in home and school. The close of the war in 1918 provided a stimulus for the protection of personal health. The establishment of the venereal disease clinic in Memphis was a direct result of the war-time program for venereal disease control. Other clinics, for the tuberculous, and for the expectant mothers and infants, were established, and coincident with this was the growth of the public health nursing service. The Memphis health department in 1929 incorporates most of the activities of a modern health department. Its work is carried on under the bureaus of administration, medical services, laboratories and sanitation, with the following subordinate divisions: vital statistics, records, communicable disease, dental hygiene, child hygiene, public health nursing, sanitary inspection, food and drugs, milk control, sanitary engineering, serology, bacteriology and milk and water analysis. In ten years, the staff of the health department has grown from 49 full-time and six part-time employes to 87 full-time and 14 part-time employes.

It is the purpose of the present survey to evaluate the public health activities of the city of Memphis and to present a constructive program of expansion so that the public

health progress of the future may be even greater than that of the past.

The Present Status of Public Health Work in Memphis.

The Memphis health department has included in its program most of the major activities necessary to provide an adequate community health program. Its work in sanitation, malaria control, milk control, control of the acute communicable diseases and venereal disease, laboratory diagnosis, and maternity hygiene, is very close to the standard requirements for these services insofar as they are defined at present. The programs for tuberculosis control and child hygiene are inadequate to meet the demand of the community for these services as indicated by the importance of tuberculosis as a cause of death among adults, and the high death rate of infants. There is little general guidance of the public health program by the analysis of the vital statistics of the community, although the basic records are complete and accurately kept.

The only public health activities for which no definite plan of control has been provided by the health department are mental hygiene, cancer control, and control of heart disease. Popular health instruction has also been carried on as a somewhat incidental activity.

The existing inadequacy in tuberculosis control, child hygiene, vital statistics and popular health instruction can be largely overcome by the employment of additional personnel. The major needs of the health department are medical directors for the division of child hygiene and the division of tuberculosis (to be established), and an increase in the public health nursing staff with specialized supervision in these fields. Other minor additions of personnel are necessary in these divisions and in the bureaus of administration and laboratories. The chief additions to the staff of the Memphis health department recommended for the adequate execution of its health program are, then:

A medical director of the division of tuberculosis
A medical director of the division of child hygiene
A part-time school physician (colored)
A nurse supervisor of tuberculosis nursing
A social worker for service at the tuberculosis clinic
Eighteen staff nurses (9 white, 9 colored)
Four district supervisors of nurses
A director of public health education
A laboratory technician
Additional clerical staff in the bureau of administration and division of child hygiene.

The expansion of the staff as recommended will require an increase of approximately $100,000 in the appropriation of the health department. This increased appropriation

will be equivalent to a per capita expenditure of approximately $1.00.

It is not thought that the budget recommended is excessive since many cities appropriate amounts for health work greatly in excess of $1.00 per capita.

The magnitude of the tuberculosis problem in Memphis requires that the newly appointed director of the division of tuberculosis confer with the health officer, the superintendent of the Oakville Tuberculosis Sanatorium, and a representative of the Shelby County Tuberculosis Society, for the purpose of formulating an adequate program of control.

The high morbidity and mortality from tuberculosis among the negroes makes it important that the plan of tuberculosis control give special attention to the negro population. It would also seem desirable that the program of diphtheria immunization should be extended to negro children, and that increased medical and dental service be provided for negro children of pre-school and school age. Of special importance is the provision of adequate institutional care, open air classrooms, etc., for substandard negro children.

The health department should attempt to transfer to private physicians the responsibility for diphtheria immunization and medical examinations of preschool and school children, in an effort to reduce the burden which the provision of these services places on the official health agency.

Expenditures for Public Health Work in Memphis.

The Memphis Health Department.

The average appropriation of the Memphis health department in the period 1925-1929 amounted to $137,600. The largest annual appropriation of the health department in that period, amounting to $150,000, was made in 1929; the actual expenditures in 1929 amounted to $148,745.95. To this amount should be added $4,030.88, the cost of the venereal disease clinic, which is included in the appropriation of the Memphis General hospital. In 1929, the total health expenditures, including this clinic, amounted to $152,776.83, or $.79 per capita. The expenditures for other services of the city government are compared with its health expenditures in Table I below:

TABLE I.

Expenditures of the Departments of the City Government, Memphis, 1929.

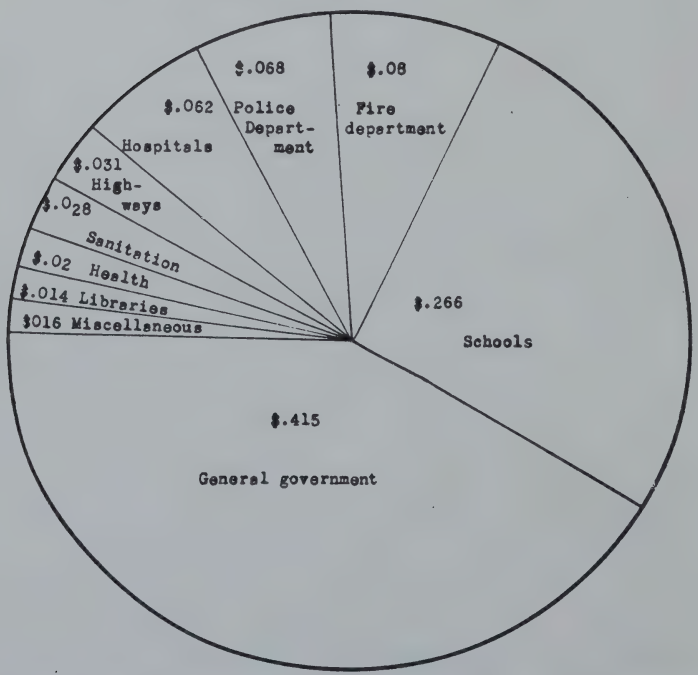
Department	Expenditures in 1929 Total	Per Capita
General Government	$3,175,873.53	$16.50
Schools (b)	2,040,148.58	10.59

TABLE I.—Continued.

Fire Department (a)	614,332.92	3.19
Police Department (a)	521,086.71	2.71
Hospitals (c)	471,198.16	2.45
Highways (a)	235,859.62	1.23
Sanitation or promotion of cleanliness	215,284.02	1.12
Conservation of Health (a)	152,776.83	.79
Libraries	104,210.40	.54
Recreation	64,765.05	.34
Juvenile Court, Municipal Court (a)	59,286.00	.30
Chauffeur Examiners	1,784.26	.01

(a) Included in expenditures of general government, with the exception of the expenditures for the municipal court, $11,244.78.
(b) These expenditures do not include interest on revenue notes and on bonds.
(c) Includes expenditures of the General Hospital, Isolation Hospital, and Tuberculosis Sanatorium.

HOW THE TAX DOLLAR IS SPENT IN MEMPHIS, TENNESSEE, 1929.



The health expenditures in 1929 were low in comparison with those of other departments of the city government. The hospital expenditures of the city of Memphis in 1929 were approximately three times as great as the expendi-

tures for the operation of its public health program. The distribution of the expenditures of the Memphis health department by major public health activities is given in Table II below:

TABLE II.

Expenditures of the Memphis Health Department, 1929

Public Health Activity	Expenditures in 1929 Total	Per Capita
Total Expenditures	$152,776.83	$ .79
Administration and Vital Statistics	13,511.19	.07
Communicable disease control (a)	4,023.56	.02
Venereal disease control	5,950.88	.03
Maternity and Child Hygiene (b)	6,083.97	.03
Dental Hygiene	6,399.32	.03
General Sanitation and Housing, Control of Milk and Other Foods	40,868.13	.22
Public Health Laboratory	10,468.55	.05
Mosquito Eradication	11,767.90	.06
Public Health Nursing	53,703.33	.28

(a) Includes expenditures for tuberculosis control, except nursing service and maintenance of the tuberculosis clinic.
(b) Nursing service included under "public health nursing."

The expenditures of the Memphis health department for tuberculosis control, venereal disease control, and the hygiene of maternity and childhood appear to be low because they do not include the salaries of physicians attending the tuberculosis, venereal disease and prenatal clinics (provided by the Memphis General hospital, the Shelby County Tuberculosis Society, the Oakville Tuberculosis Sanatorium and the Shelby County health department), and the cost of clinic maintenance (except maintenance of the venereal disease clinic).

Non-Official Health Agencies.

The most important non-official health agency in Memphis is the Shelby County Tuberculosis Society. The expenditures of this society in 1929 amounted to $25,075.13, or a per capita expenditure of $.13. This total expenditure was distributed as shown in Table III below:

TABLE III.

Classification of Expenditures of the SHELBY COUNTY TUBERCULOSIS SOCIETY 1929

Activity	Expenditures 1929
Total Expenditures	$25,075.13
Administration	4,907.57
Health Education and Publicity	1,804.70
Medical Service	2,908.30

TABLE III.—Continued.

Tuberculosis Nursing Service	2,880.00
Summer Camps	6,471.73
Scholarships (teachers)	360.26
All other expenditures	5,742.57

Health Expenditures of Other Cities.

The total per capita expenditures of the official and non-official health agencies of Memphis amounted to $.92 in 1929, $.79 being the per capita expenditure of the official agencies (Memphis health department and city of Memphis), and $.13 the per capita expenditure of the non-official health agency (the Shelby County Tuberculosis Society). This expenditure is exceeded by many cities of this country. In 1929, New Haven, Connecticut, made a per capita expenditure of $2.41 for public health work. The per capita health expenditure of Syracuse, New York, in the same year was $3.06; of Milwaukee, Wisconsin, $1.31; and of Cincinnati, Ohio, $1.54. A comparison of expenditures for public health work in several cities of this country is given in Table IV.

TABLE IV.

Expenditures for Public Health Activities in Several American Cities (a), 1929.

City	Estimated Population July 1, 1929	Per Capita Health Expenditures		
		Total	Official Agencies	Non-official Agencies
Philadelphia, Pa. (b)	2,064,200	$ .94	$ .55	$ .39
Portland, Oregon (b)	336,163	.94	.59	.35
Milwaukee, Wis.	580,000	1.31	.92	.39
Detroit, Mich	1,429,200	1.34	1.23	.11
Denver, Col.	300,000	1.36	.89	.47
Cincinnati, Ohio	415,200	1.54	.71	.83
Rochester, N. Y.	332,605	1.58	1.48	.10
Yonkers, N. Y.	123,802	1.83	1.56	.27
Buffalo, N. Y.	555,800	2.00	1.10	.90
Albany, N. Y.	121,194	2.37	1.77	.60
New Haven, Conn.	190,847	2.41	1.42	.99
Syracuse, N. Y.	201,645	3.06	2.17	.89
Memphis, Tenn.	192,515	.92	.79	.13

(a) Data from schedules submitted in the Inter-Chamber Health Conservation Contest, 1930, except for Philadelphia, Portland, and Memphis, which were obtained by the Committee on Administrative Practice, American Public Health Association.

(b) Data for 1928.

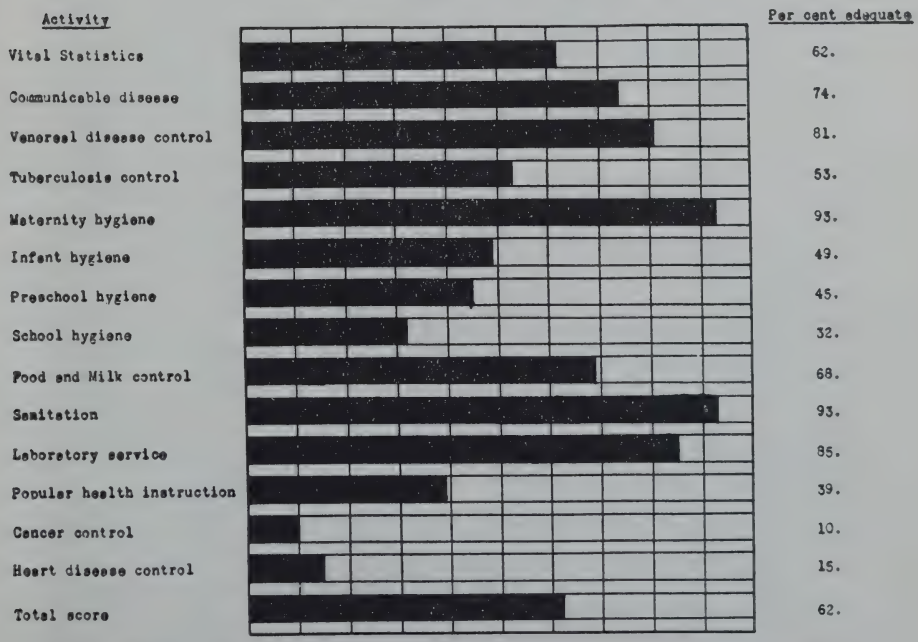
TABLE V.

Appraisal Score for 14 Major Health Activities, Memphis, Tenn., 1929 (a).

	Weighting factor	×	Score attained	=	Weighted score
Vital statistics	.50		62		31
Communicable disease control	1.60		74		118
Venereal disease control	.50		81		41
Tuberculosis control	.90		53		48
Maternity hygiene	.80		93		74
Infant hygiene	.80		49		39
Preschool hygiene	.80		45		36
School hygiene	1.20		32		38
Food and Milk control	.70		69		48
Sanitation	.80		93		74
Laboratory	.60		85		51
Public health instruction	.40		39		16
Cancer control	.20		10		2
Heart disease control	.20		15		3
Total					619

(a) Based on Appraisal Form for City Health Work, American Public Health Association, 3d edition, 1928.

APPRAISAL SCORE FOR FOURTEEN MAJOR HEALTH ACTIVITIES, MEMPHIS, TENN., 1929*



*Based on Appraisal Form for City Health Work, American Public Health Association, 3rd edition, 1928

VITAL STATISTICS

Population.

When the city of Memphis was established, in 1826, its population was approximately 500. In six years, its population had doubled; by 1850, its population was approximately 9,000.

In the 50 years between 1850 and 1900, Memphis developed from a town of less than 10,000 population to a city of 100,000 population. Its growth in the present century has been very rapid, its population having doubled between 1900 and 1929.

The final enumeration of the total population and of the population by color by the census as of April, 1930, has not been released by the U. S. Bureau of the Census. It is not possible, therefore, to make a final revision of the estimates of the Memphis population for the intercensal period 1921-1929, based on the 1930 census. In this report, the estimates of the Memphis population for 1921-1929 used as the basis for birth rates, death rates and quotas for health services, are those calculated by the Memphis health department prior to the census of 1930.

Tentative revised estimates of the total population for the intercensal years 1921-1929, based on the preliminary enumeration of the total population in the 1930 census, are

TABLE VI.
NUMBER OF THE POPULATION OF MEMPHIS
1830-1929 (a).

Year	Total	White	Colored
1830	888	(b)	(b)
1840	1,858	(b)	(b)
1850	8,956	6,458	2,498
1860	22,770	18,791	3,979
1870	40,373	24,805	15,568
1880	33,849	18,819	15,030
1890	64,517	35,760	28,757
1900	102,562	52,600	49,962
1910	131,527	78,966	52,561
1920	163,453	102,073	61,380
1929 (c)	192,515	128,258	64,257

(a) Figures as of July 1, estimated on the basis of the nearest census.
(b) Not available.
(c) The preliminary enumeration of the total population of Memphis, including a large area annexed on November 1, 1929, was 252,049 by the census of April 1, 1930. A tentative revision of the population estimate as of July 1, 1929, on the basis of the 1930 census, gives the figure 212,383. (For the method of calculation, see appendix. The preliminary enumeration of the population by color as of April 1, 1930, has not been released by the U. S. Bureau of the Census.

given in the appendix. A comparison of these figures with the estimates of population based on the census of 1910 and 1920, indicates the extent of under statement of the latter. The birth and mortality rates of Memphis presented in this report therefore exceed the true birth and mortality rates because of the error necessarily introduced by the use of uncorrected population estimates.

Birth Rates.

Prior to 1922, there was extreme fluctuation in the birth rate of Memphis. In 1910, the birth rate (including resident and non-resident births) of the total population of Memphis was 21.6 per 1,000 population; in 1912, the rate decreased to 9.3. In 1914, the birth rate increased to 15.3, but did not again exceed 20 until 1923, when it was 23.2. The state of Tennessee was admitted to the U. S. Birth Registration Area in 1927. Assurance that birth reporting in Memphis is complete, by check of the U. S. Bureau of the Census, dates, therefore, from that year. The Memphis health department believes, however, that birth reporting has been complete in Memphis since 1922.

Any consideration of the birth rate of Memphis must be based on a study of resident births since Memphis is the hospital center of West Tennessee, Mississippi and Arkansas, and the number of births in its hospitals to non-resident women is high. Births have been classified by residence by the Memphis health department only since 1924. The resident birth rates for the total white and colored populations of Memphis for the period 1924-1929 are presented in Table VII.

TABLE VII.

RESIDENT BIRTHS AND BIRTH RATES BY COLOR

Memphis, 1924-1929.

Year	Resident Live Births			Resident Births Per 1,000 Estimated Population		
	Total	White	Colored	Total	White	Colored
1924	3,932	2,334	1,598	22.8	21.3	25.6
1925	3,754	2,275	1,479	21.5	20.4	23.6
1926	3,656	2,174	1,482	20.7	19.1	23.5
1927	3,736	2,174	1,562	20.9	18.8	24.6
1928	3,751	2,277	1,474	19.7	18.0	23.0
1929	3,730	2,288	1,442	19.4	17.8	22.4

A slight downward trend is apparent in both white and colored birth rates since 1924.

TABLE VIII.
RESIDENT STILLBIRTHS AND STILLBIRTH RATES BY COLOR. Memphis, 1924-1929.

Year	Resident Live Births			Resident Stillbirths.			Stillbirth Rate (a)		
	Total	White	Colored	Total	White	Colored	Total	White	Colored
1924	3,932	2,334	1,598	235	85	150	6.0	3.6	9.4
1925	3,754	2,275	1,479	232	82	150	6.2	3.6	10.1
1926	3,656	2,174	1,482	219	82	137	6.0	3.8	9.2
1927	3,736	2,174	1,562	230	78	152	6.2	3.6	9.7
1928	3,751	2,277	1,474	216	72	144	5.8	3.2	9.8
1929	3,730	2,288	1,442	228	87	141	6.1	3.8	9.8

(a) Stillbirths per 100 live births.

The stillbirth rate likewise must be based on resident stillbirths. Resident stillbirth rates for the total white and colored population of Memphis are shown in Table VIII.

The stillbirth rate of the white population of Memphis is of about the same magnitude as that of the white population of the U. S. Birth Registration Area. Thus, among the white population of the U. S. Birth Registration Area in 1926 and 1927, there were 3.5 stillbirths for every 100 live births; the stillbirth rates for the white population of Memphis in 1926 and 1927 were, respectively, 3.8 and 3.6. The stillbirth rates for the colored population of Memphis are higher than those for the colored population of the U. S. Birth Registration Area. In 1926, the stillbirth rate for the colored population of the U. S. Birth Registration Area was 7.3, and in 1927, 7.5; in the same years, the stillbirth rates for the colored population of Memphis were, respectively, 9.2 and 9.7. The stillbirth rate among the colored population of Memphis is from two and one-half to three times as high as that of the white population; the stillbirth rate for the total population is, therefore, high.

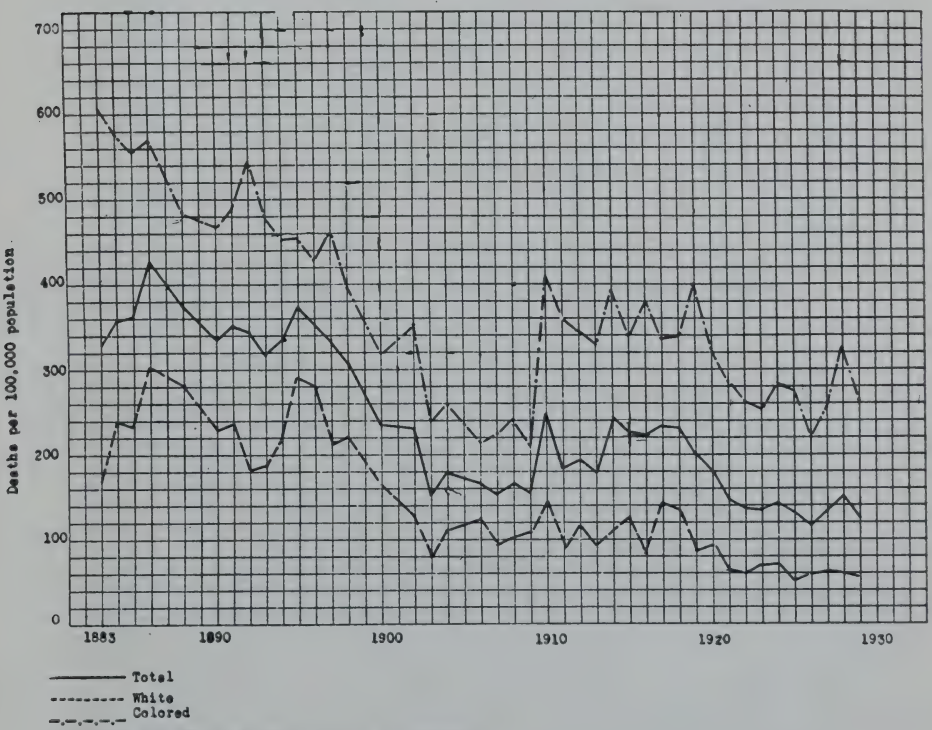
Mortality Rates.

In the fifth annual report of the Memphis board of health, the president called attention to the importance of excluding deaths of non-residents in determining the death rate of Memphis. The importance of such a treatment of its death rate has increased as the hospital facilities of Memphis have improved. As the hospital center of the mid-south, Memphis adds to its resident deaths those of many residents of Arkansas, Mississippi, and other cities of West Tennessee, which occur in its hospitals. The true status of the mortality rate of Memphis can be determined only by

excluding these non-resident deaths, and by reallocating to Memphis the deaths of its residents occurring outside the city.

The Memphis health department has classified deaths occurring in Memphis by cause and residence since 1922. Records of deaths of Memphis residents occurring outside Memphis are available only for a single cause of death, tuberculosis*. The death rates here presented are corrected, therefore, for deaths of non-residents occurring in Memphis; the reciprocal correction for deaths of residents occurring outside the city was made only in the case of deaths from tuberculosis. The error resulting from inability to correct the death rate for all deaths of Memphis residents occurring outside the city is believed to be slight.

TUBERCULOSIS DEATHS PER 100,000 POPULATION BY COLOR, MEMPHIS, TENN., 1883-1929



Death Rates from All Causes.

The exclusion of deaths of non-residents occurring in

(*) Records of deaths of Memphis residents occurring at the Oakville Tuberculosis Sanatorium were obtained from the Memphis Health Department. Death certificates for Memphis residents dying at Oakville are filed with the district registrar of Shelby County and enumerated as deaths of Shelby County residents.

Memphis causes a marked decrease in the death rate from all causes. The total resident death rate remains high in spite of this correction, since the death rate of the colored population is between two and two and one-half times as high as that of the white population.

The death rates from all causes for the city of Memphis in the period 1922-1929 are shown in Table IX.

TABLE IX.
DEATHS FROM ALL CAUSES BY RESIDENCE, PER 1,000 ESTIMATED POPULATION
Memphis, 1922-1929.

	Deaths from All Causes, exclusive of Stillbirths, per 1,000 Estimated Population					
	Total deaths, residents and non-residents			Total resident deaths (a)		
Year	Total Population	White	Colored	Total Population	White	Colored
1922 ...	17.8	14.1	24.0	15.0	10.9	22.0
1923 ...	19.9	15.6	27.4	16.3	11.5	24.7
1924 ...	20.4	14.2	31.3	16.7	10.3	28.0
1925 ...	19.4	14.0	29.0	16.1	10.0	26.9
1926 ...	20.0	15.3	28.4	16.1	10.7	25.7
1927 ...	19.3	15.2	26.9	15.3	10.8	23.4
1928 ...	19.7	15.3	28.4	15.7	10.9	25.4
1929 ...	20.1	15.7	29.0	15.7	10.5	26.2

(a) These rates are based on deaths of residents of Memphis occurring in the city of Memphis, and for the period 1925-1929 include deaths of Memphis residents occurring at the Oakville Tuberculosis Sanatorium. Deaths of Memphis residents from other causes, occurring outside the city, are not included.

In the period 1922-1929, the variation shown by the resident death rate of Memphis has been slight. It is necessary to observe the death rate over a longer period of years to determine the extent of its reduction. For this purpose, the ratio of births to deaths, known as the vital index, offers a better measure of variation in mortality than the death rate since it eliminates the error introduced by the use of estimates of population. The ratios of births to deaths for the white and colored population of Memphis, including residents and non-residents, in the period 1908-1929, are shown in the diagram.

Prior to 1920, there was extreme fluctuation in the ratios of births to deaths among both the white and colored population of Memphis. Since 1920, the ratios have continued to fluctuate among the white population, but have shown a fairly constant increase among the colored population. In spite of these fluctuations a definite upward trend is apparent in the vital index of both white and colored population since 1908.

Death Rates from Specific Causes.

The high death rate among the colored population of Memphis in comparison with the white population indicates the importance of studying the specific mortality rates of the Memphis population by color. The death rates from important causes among the resident white population of Memphis in the period 1922-1929 are shown in Table X.

VITAL INDEX BY COLOR, MEMPHIS, TENN., 1908-1929, ALSO FOR RESIDENTS ONLY 1924-1929

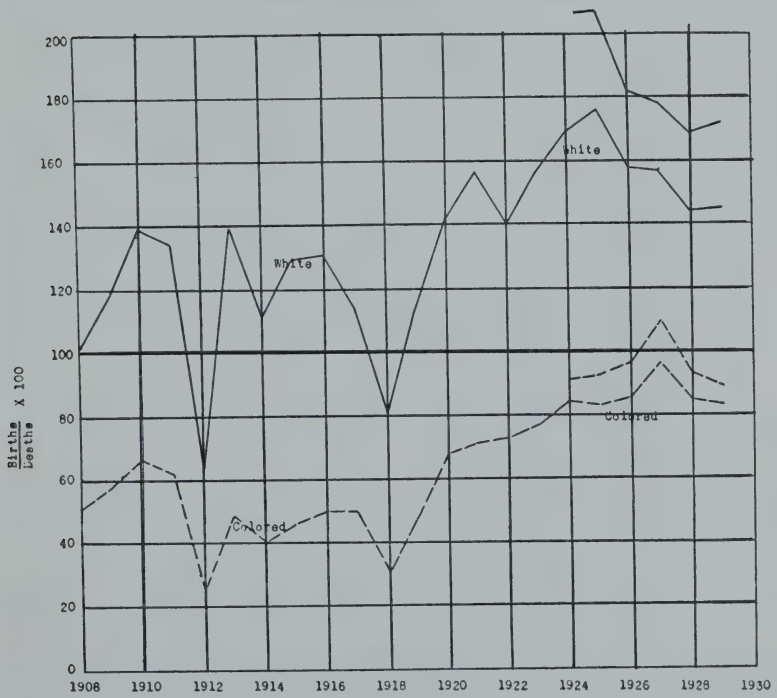


TABLE X.

RESIDENT DEATH RATES FROM IMPORTANT CAUSES AMONG THE WHITE POPULATION

Memphis, 1922-1929.

	Resident Deaths from Specified Causes, per 100,000 Estimated White Population							
	1922	1923	1924	1925	1926	1927	1928	1929
Diseases of the heart.	133.1	154.0	135.7	121.8	132.9	129.9	134.7	120.8
Violence, all forms...	94.4	83.5	79.2	77.0	98.6	93.5	95.9	93.5
Cancer, all forms....	79.4	67.8	82.0	70.0	76.5	93.5	90.4	85.0
Chronic Nephritis ...	92.6	69.6	65.6	54.6	90.0	82.3	88.0	66.4
Tuberculosis all forms	64.2a	70.5a	61.0a	60.9	73.1	81.4	78.4	70.1
Cerebral Hemorrhage	61.5	65.0	52.9	82.5	63.4	73.6	67.3	65.5
Lobar Pneumonia ...	61.5	60.4	51.0	41.2	47.5	42.4	49.0	42.0

Broncho Pneumonia .	57.6	100.2	59.3	44.8	37.8	35.5	31.6	35.8
Influenza	16.1	21.4	13.7	44.8	32.6	21.6	36.4	62.4

(a) Exclusive of deaths of Memphis residents occurring in the Oakville Tuberculosis Sanatorium, Shelby County.

Among the white population of Memphis, diseases of the heart, violence (all forms), cancer (all forms), chronic nephritis, and tuberculosis (all forms), were the five leading causes of death in each year of the period 1922-1929, except 1925. In that year, the death rate from cerebral hemorrhage exceeded all other causes of death except diseases of the heart. The respiratory diseases, lobar pneumonia, broncho pneumonia, and influenza, together constitute a major cause of death among the white population; as single causes of death, they are exceeded in importance by the degenerative diseases, and by tuberculosis and violence. In contrast to the white population the five leading causes of death among the colored population of Memphis in the period 1922-1929 were, tuberculosis (all forms), diseases of the heart, violence (all forms), lobar pneumonia, and chronic nephritis, in that order. Tuberculosis, which is fifth in importance as a cause of death among the white population, is the leading cause of death among the colored population of Memphis.

The death rates from important causes among the colored population of Memphis in the period 1922-1929, are shown in Table XI.

TABLE XI.

RESIDENT DEATH RATES FROM IMPORTANT CAUSES AMONG THE COLORED POPULATION

Memphis, 1922-1929.

	Resident Deaths from Specified Causes, per 100,000 Estimated Colored Population							
	1922	1923	1924	1925	1926	1927	1928	1929
Tuberc., all forms....	298.9a	295.8a	350.4a	428.3	378.8	340.7	415.6	387.2
Diseases of the heart	222.9	223.5	296.0	285.0	213.9	239.7	259.4	278.4
Violence, all forms...	169.6	184.9	198.4	189.5	206.0	190.9	209.4	234.8
Lobar Pneumonia ...	176.0	204.0	246.0	183.0	158.5	145.0	181.5	143.0
Chronic Nephritis ...	138.9	133.4	150.4	144.9	199.7	164.0	153.1	144.6
Cerebral Hemorrhage	87.3	85.3	126.0	82.9	123.6	134.0	115.7	129.0
Broncho Pneumonia .	119.2	175.4	126.0	151.0	77.7	75.8	61.0	87.2
Influenza	27.4	114.0	62.4	105.0	115.6	79.0	90.8	151.0
Cancer, all forms....	63.0	66.0	78.4	78.0	107.0	85.3	72.0	92.0

(a) Exclusive of deaths of Memphis residents occurring in the Oakville Tuberculosis Sanatorium.

In the case of the white population no one of the acute respiratory diseases is as important a factor in mortality as the degenerative diseases. Among the colored population, however, lobar pneumonia causes, on the average, a larger

number of deaths than any of the degenerative diseases except diseases of the heart.

Because of the importance of tuberculosis as a cause of death it is of interest to determine the relative importance of pulmonary and other forms of tuberculosis among the white and colored population. Table XII below shows the death rates of Memphis residents from tuberculosis, all forms, pulmonary tuberculosis, and all other forms of tuberculosis.

TABLE XII.

RESIDENT DEATH RATES FROM TUBERCULOSIS PER 100,000 ESTIMATED POPULATION

Memphis, 1922-1929.

Year	Tuberculosis, All Forms			Pulmonary Tuberculosis			Tuberculosis, Other Forms		
	Total	White	Colored	Total	White	Colored	Total	White	Colored
1922	150.7	64.2	298.9	131.0	56.7	258.5	19.7	7.6	40.4
1923	152.9	70.5	295.8	126.4	61.2	239.5	26.5	9.3	56.3
1924	166.0	61.0	350.4	133.5	53.8	273.6	32.5	7.3	76.8
1925	193.1	60.9	428.3	173.1	57.3	379.0	20.1	3.6	49.1
1926	182.2	73.1	378.8	156.2	69.5	312.2	26.0	3.5	66.6
1927	173.3	81.4	340.7	158.2	74.5	310.7	15.1	6.9	30.0
1928	191.9	78.4	415.6	170.3	70.5	367.2	21.6	7.9	48.4
1929	176.1	70.1	387.2	155.8	63.1	340.6	20.3	7.0	46.7

The death rates from tuberculosis, all forms, and from pulmonary tuberculosis among the colored population are from four to five times as high as those among the white population; the death rates from nonpulmonary tuberculosis among the colored population are from four to ten times as high as those for the white population.

In the period 1922-1929, the tuberculosis death rate of both white and colored population has shown great fluctuation and no significant decrease. Over a longer period a marked reduction in the death rate from pulmonary tuberculosis is apparent. This is shown graphically for the period 1883-1929, in the diagram (the deaths are uncorrected for residence of decedent). Thus, while reduction in the tuberculosis death rate has been slowly accomplished, the past achievement of Memphis indicates the possibility of greater reduction if an active program of tuberculosis control is introduced.

Further indication of the possibility of reduction of mortality in Memphis under an adequate plan of control is given by the course of the death rates from typhoid fever

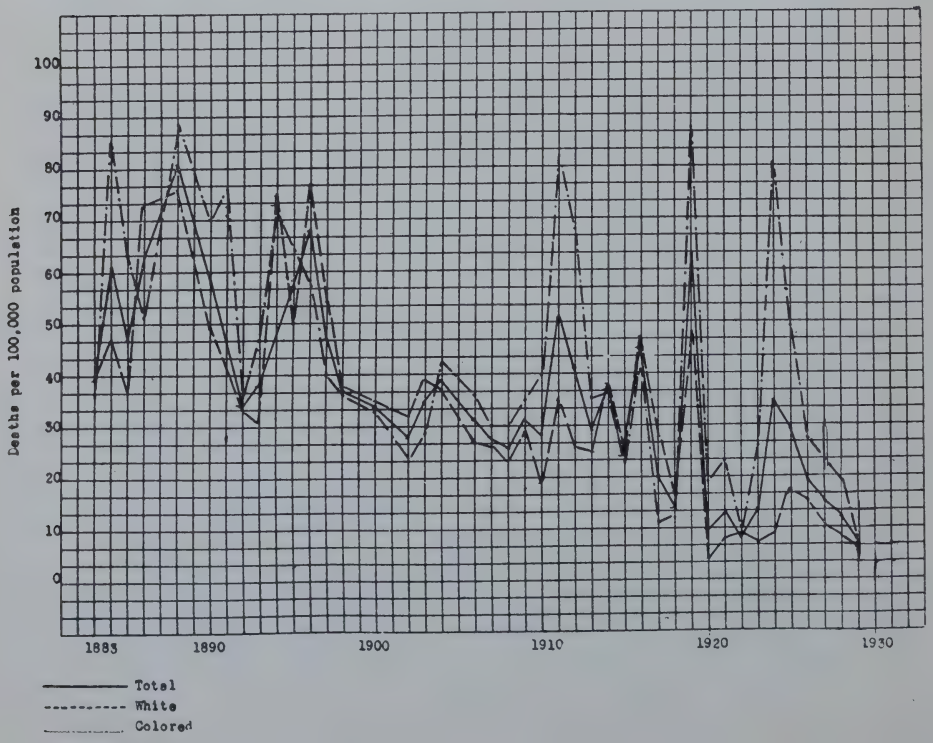
and malaria. In Table XIII the resident death rates from these causes are presented for the period 1922-1929.

TABLE XIII.
RESIDENT DEATH RATES FROM MALARIA AND TYPHOID FEVER. Memphis, 1922-1929.

Year	Resident Deaths from Specified Causes, per 100,000 Estimated Population			
	Malaria		Typhoid Fever	
	White	Colored	White	Colored
1922	10.4	27.4	3.8	6.5
1923	3.7	17.7	2.8	17.7
1924	3.6	12.8	7.3	65.6
1925	6.3	6.4	9.9	31.8
1926	3.5	9.5	6.2	19.0
1927	4.3	9.5	3.5	17.4
1928	2.4	14.1	4.8	17.2
1929	3.1	10.9	0	4.7

While the death rates from these causes are still high among the colored population, great progress has been made in their reduction. In only one year since 1922 has the malaria death rate among the colored population exceeded 20 per 100,000; prior to 1913, the malaria death rate among

TYPHOID FEVER DEATHS PER 100,000 POPULATION BY COLOR, MEMPHIS, TENN., 1883-1929



the colored population regularly exceeded 100. The reduction in the typhoid fever death rate has been no less striking. The death rates from typhoid fever and malaria for the white and colored population of Memphis from 1883 to 1929 are shown graphically in the diagram.

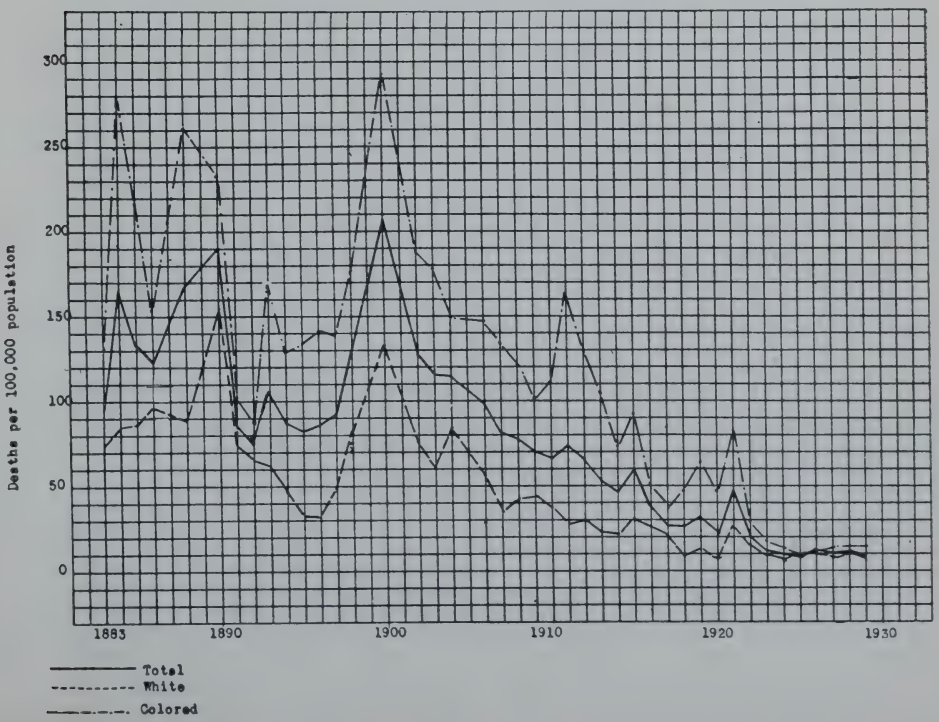
The death rates from the communicable diseases of childhood are shown in Table XIV.

TABLE XIV.

MORTALITY FROM THE COMMUNICABLE DISEASES OF CHILDHOOD, DEATH RATES PER 100,000 ESTIMATED POPULATION, MEMPHIS, 1922-1929.

Year	Measles Total Pop.	Measles White	Measles Col.	Scarlet Fever Total Pop.	Scarlet Fever White	Scarlet Fever Col.	Whooping Cough Total Pop.	Whooping Cough White	Whooping Cough Col.	Diphtheria Total Pop.	Diphtheria White	Diphtheria Col.
1922	0	0	0	3.6	5.7	0	2.4	0	6.5	9.5	8.4	11.3
1923	12.9	16.7	6.4	1.2	1.9	0	4.1	1.9	8.0	5.9	3.7	9.6
1924	4.1	5.5	1.6	4.6	7.3	0	3.5	0.9	8.0	5.8	3.6	9.6
1925	2.3	0.9	4.8	1.7	1.8	1.6	7.5	4.5	12.7	1.7	1.8	1.6
1926	6.8	7.9	4.8	2.8	4.4	0	7.4	4.4	12.7	6.8	7.9	4.8
1927	2.8	2.6	3.2	1.7	2.6	0	12.9	7.8	22.1	3.4	3.5	3.2
1928	4.2	3.2	6.3	0	0	0	2.1	2.4	1.6	2.6	2.4	3.1
1929	0	0	0	1.6	2.3	0	7.3	4.7	12.4	7.3	2.3	17.1

MALARIA DEATHS PER 100,000 POPULATION BY COLOR, MEMPHIS, TENN., 1883-1929



STATISTICAL PROCEDURE AND ANALYSIS.

An ordinance passed on September 26, 1923, by the board of commissioners of the city of Memphis provided that the bureau of administration should have control over the registration of vital statistics and records of the health department. It was also provided that the superintendent of health should be registrar of vital statistics and that he should be assisted by a deputy and an assistant registrar.

The staff of the division of vital statistics consists, therefore, of a registrar, deputy registrar and assistant registrar. The director of the bureau of medical service also gives assistance to this division by classifying causes of death according to the International List, and by querying unsatisfactory or doubtful causes.

The state of Tennessee was admitted to the U. S. Death Registration Area in 1917, and to the U. S. Birth Registration Area in 1927. The birth rate of Memphis appears to be constant beginning with the year 1922. Birth rates and infant mortality rates may, therefore, be considered accurate from this date, although admission of the state to the Birth Registration Area occurred later.

Birth Statistics.

Certificates of births are checked for completeness and reconciled before filing. Death certificates of infants under one year are routinely checked against birth certificates and certificates of stillbirths. The birth certificates are indexed alphabetically by name in bound books, each of which contains the certificates for one month. There is no annual index of births and much time is lost in locating birth certificates in cases in which the exact month of birth is not known. Supplementary reports of names are recorded on birth certificates.

Births are tabulated annually by sex and by color of mother, and monthly by kind of obstetrical care. The place of birth, that is, hospital or home, is indicated. Hospital births are further classified according to the particular hospital in which they occurred, the births in the Memphis General hospital being tabulated separately, and births in the other hospitals classified together. Births occurring at home are classified by color of the attending physician or midwife. There is no annual tabulation of births by kind of obstetrical care.

Certain facts from the birth certificate are copied on a birth card which is signed by the superintendent of health and delivered to the mother of each new born infant by the nurse in the district of residence.

Specific infant mortality rates are computed for the white and colored infant population.

Death Statistics.

Death certificates are checked for completeness and reconciled before being copied. The cause of death is scrutinized by the director of the division of medical service and classified according to the International List of Causes of Death. Deaths from tuberculosis, diphtheria, measles, typhoid fever, scarlet fever and whooping cough, are checked against the reports of cases of these diseases.

The copies of the death certificates are indexed alphabetically by name in bound books, the certificates for each month being copied in a separate book. Access to these certificates is made difficult by the lack of an annual index. The death certificates are stored in a wooden bookcase.

The death certificates are tabulated monthly and annually by cause, sex, age, color and residence. Deaths under one year are tabulated by cause and by subdivision of the first year, that is, days of the first week, weeks of the first month, and the first to the eleventh month, inclusive. Puerperal deaths are tabulated annually by cause; there is no tabulation of these deaths by kind of obstetrical care.

Analysis and Interpretation of Vital Statistics.

The vital statistics of a community should contribute to the formation of its public health program. A rise in the infant mortality rate is an indication for intensification of the health department's activities in infant hygiene. A high death rate from diphtheria emphasizes the necessity for increased effort in diphtheria immunization. An increase in the cancer death rate suggests the need for special educational activities promoting early diagnosis. If tuberculosis appears among the leading causes of death, then control of tuberculosis must be a major activity of the health department.

Thus, analysis of mortality rates is of very practical importance to the health department. Monthly summaries of the leading causes of death, and of the death rates from the communicable diseases, should be prepared. The trend of the crude death rate, the principal causes of death, the communicable diseases of childhood, and total and specific infant mortality rates, should be followed by means of graphs. There should be prepared annually a statistical report which shows in detail the mortality status of the community.

The small staff of the division of vital statistics of the Memphis health department limits the extent to which such

analyses of its vital statistics are made. The health department prepares annually a typewritten report showing the birth rate, crude death rate, the infant mortality rate and the maternal mortality rate. No annual or monthly summary of specific death rates is prepared, nor is the trend of important causes of death followed graphically.

While the basic statistical procedures of the division of vital statistics are, on the whole, adequate and accurately executed, the use of the vital statistics is limited, thus defeating the purpose for which vital records are collected.

Appraisal Score.

The activities of the Memphis health department in vital statistics score 62 out of the 100 points indicating relatively complete statistical procedure and analysis. The chief deficiency in this field, as indicated above, is the limited analysis and interpretation of the vital statistics.

Recommendations.

(1) The major recommendation for the improvement of the work of the division of vital statistics is that personnel be increased by one statistical clerk in order to extend the statistical work, not only of this division, but also of the nursing and medical services. An increase in personnel would permit analysis and interpretation of the vital statistics, and a greater use of the statistical material for administrative guidance.

(2) To meet the demands for certified copies of death certificates requested before the originals are transmitted to the state, the following procedure is suggested: two copies of the original certificate to be made, one copy to be transmitted to the state department of vital statistics with the monthly transfer of certificates, the other to be retained in the local file, thus making it possible to forward the original certificate immediately to the state department of vital statistics with the request for certified copy attached.

(3) It is recommended that the division of vital statistics attempt to secure reports of deaths of Memphis residents occurring in Shelby county and elsewhere without the city. A large error is introduced in the tuberculosis death rate of Memphis, for example, by the failure to allocate to the city of Memphis deaths of Memphis residents occurring in the Oakville Tuberculosis Sanatorium, a Shelby county institution. It should be possible to calculate a true resident death rate, rather than a rate which eliminates deaths of non-residents but does not include deaths of residents outside of the city.

(4) It is recommended that an alphabetical card file, continuous over a period of one or several years, be set up

for births and deaths. It is also recommended that a suitable fire-proof filing cabinet be installed for the storage of birth and death certificates.

COMMUNICABLE DISEASE CONTROL.

Control of communicable diseases is administered by the division of communicable disease, the director of which is also director of the bureau of medical service. One public health nurse is assigned to the director to assist in the control of cases of communicable disease.

The communicable diseases reportable to the Memphis health department are those specified in the "Regulations Governing Communicable Diseases in Tennessee," a bulletin published by the Tennessee state department of public health. Reports of communicable diseases made by telephone are accepted in lieu of written reports. A positive specimen is equivalent also to a report of the disease in question.

A study of the cases and deaths from certain communicable dieases for the past three years leads to the conclusion that the reporting of cases of diphtheria, scarlet fever, typhoid fever and measles is adequate; reporting appears to be slightly inadequate, however, for whooping cough.

An investigation of each case of typhoid fever, diphtheria, scarlet fever, and smallpox is made by the director of the division of communicable diseases or the nurse assigned to communicable disease work. The scarlet fever cases are placarded by the director of the division of communicable disease, who also isolate the case for a period of 21 days. The communicable disease nurse makes revisits to these cases.

No chronological charts or spot maps of cases of acute communicable disease were made in 1929. While the construction of these charts may be omitted in periods of low incidence of these diseases, the chronological chart has been found to be a useful device which might well be kept at all times. It calls attention to deviations from normal incidence of the acute communicable diseases and points the need for more complete epidemiological records, spot maps, etc., at such times.

Control of Diphtheria.

Control of diphtheria is carried on in general according to the regulations of the Tennessee state department of health. Family contacts are cultured and held in isolation until the diagnosis of the culture is made. Household contacts who are susceptible to diphtheria are not given passive

immunity by the use of antitoxin; however, this practice is recommended but not required by the state regulations governing control of diphtheria. Release of cases of diphtheria from quarantine is made after two successive negative cultures from the throat, and from throat and nose only if nasal diphtheria is suspected. The failure to require negative nasal cultures for the release of all cases of diphtheria is at variance with standard practice, and with the regulations of the Tennessee state department of health. Antitoxin is freely available for cases and contacts under the control of the health department but only for the indigent cases of private physicians. The examinations of diphtheria cultures at the health department laboratory in 1929 appear to have been adequate in number, although only 29 per cent of the total examinations made were nasal cultures.

Eighteen of the 20 deaths from diphtheria occurring in Memphis in 1929 were among children under six years of age. Thus, diphtheria prevention in Memphis, as in the average community, should be most actively carried on among the preschool population. In 1929, there was an estimated population of preschool age in Memphis of approximately 20,000 children. In order to establish immunity among the group of children who annually pass from early infancy to this age of highest susceptibility, about 2,000 immunizations of children of preschool age should be made in Memphis each year. Yet the average number of preschool children immunized in the period 1927 to 1929 was 732, roughly, a third of this number. Only 14 of these were immunizations of colored children.

This small number of immunizations of preschool children is not compensated for by a proportionate intensification of the immunization program among school children. In the period 1927 to 1929, when the average elementary school enrollment was 35,101, a total of 6,938 school children were given toxin-antitoxin, and an additional 921 school children were shown to be immune by negative Schick reactions. This is equivalent to the immunization of about 2,600 children annually for the past three years. A very small proportion of these children were colored. Adequate immunization of school children against diphtheria requires the immunization of about ten per cent of the average elementary school population annually. An average of only seven per cent of the school children of Memphis were immunized, or shown to be immune to diphtheria, in the period 1927-1929.

It is thus apparent that the diphtheria immunization program must be intensified, especially among the preschool

population, if Memphis children are to be protected from diphtheria.

Control of Typhoid Fever, Smallpox, Scarlet Fever and Ophthalmia Neonatorum.

Cases of typhoid fever are usually released from quarantine only after obtaining two negative cultures from the stool and urine of the patient. The Tennessee state department of health requires release by laboratory examination (one negative specimen of urine and feces). This control practice is not enforced in Memphis. The health department provides adequate laboratory service for the diagnosis of typhoid fever, and there would seem to be no justification for this failure to conform with general practice in typhoid control.

The control of smallpox is facilitated by the local health ordinance passed in 1882, which provides that no child may enter school unless successfully vaccinated or unless a certificate from a good physician is presented stating that vaccination has been tried and failed. The local adoption of measures to secure smallpox vaccination is authorized by a section of the administrative reorganization law of 1923 creating the Tennessee state department of health.

Any smallpox contacts which are still susceptible are vaccinated when a case of smallpox occurs.

Contacts of cases of scarlet fever not known to be immune are quarantined for seven days from the appearance of the eruption of the case, if they are transferred to a household in which there are no children. Children not known to be immune who have remained in the house with a case are quarantined for 21 days from the appearance of the eruption. These are the control practices required by the Tennessee state department of health.

Cases of ophthalmia neonatorum are reported to the health department. Twelve white cases and 58 colored cases were visited by health department nurses and the director of medical service in 1929. Prophylactic outfits are supplied free to physicians and midwives by the Tennessee state department of public health.

Nursing Service to Cases of Communicable Disease.

Nursing visits to cases of diphtheria, scarlet fever, poliomyelitis, measles, and whooping cough appear to have been sufficient to provide adequate control of cases of these communicable diseases in 1929. Visits to cases of typhoid fever and cerebro-spinal meningitis were not adequate. It is especially important that an adequate number of visits be made to typhoid cases to permit collection of specimens for

laboratory examination so that the carrier state of the case may be determined before release.

The health department maintains a consulting diagnostic service for physicians which appears to be adequate to the needs of the population.

Hospitalization.

Hospitalization of typhoid fever, diphtheria, and smallpox cases is adequate. Hospitalization of scarlet fever cases appears to be inadequate, but is probably sufficient to care for cases suffering from the mild form of this disease prevalent in Memphis.

Appraisal Score.

The activities of the Memphis health department in control of communicable disease score 74 per cent, indicating a program which, although not ideal, is well executed. One of the major defects in this program is in diphtheria prevention, particularly the diphtheria immunization activities among preschool children.

Recommendations.

(1) It is recommended that the program for immunization of children against diphtheria be made more aggressive and that greater emphasis be placed upon immunization of children of preschool age, including both white and colored children. It is suggested that a slip explaining the advantages of diphtheria immunization for infants over six months of age be enclosed with the copy of the birth certificate distributed to the mothers of young infants. The problem of extension of diphtheria immunization among the colored children should be discussed with the committee on Negro Health for co-operative action. It is suggested that an increased number of immunizations of school children might be obtained by the follow-up of susceptible children on entrance to school as in the case of smallpox vaccination.

(2) It is recommended that local practice in the control of diphtheria and typhoid fever be harmonized with that required by the Tennessee state department of health and the standard practice for the control of communicable disease as defined in the recent code of the American Public Health Association. Diphtheria cases should be released only after two successive negative cultures from the nose and throat. It is recommended also that two negative cultures of the stool and urine of typhoid cases be required before their release. This is essential if typhoid carriers are to be controlled.

(3) The personnel of the division of communicable dis-

ease should be increased to permit the study of epidemiological records and the current observation of the trend of communicable disease incidence.

(4) Typhoid immunization should be promoted among the residents of areas of the city not yet connected with the city sewerage system, or the public water supply, and also among vacationists.

(5) It is recommended that legal provision for the hospitalization of cases of communicable disease be improved.

VENEREAL DISEASE CONTROL

Venereal Disease Incidence.

The director of the venereal disease clinic, several hospitals and many local physicians transmit their reports of cases of venereal disease to the Tennessee state department of health, which, in turn, makes reports to the Memphis health department. The cases of syphilis and gonorrhea thus reported between 1925 and 1929 are shown in Table XV.

TABLE XV.

Incidence of Venereal Disease Cases of SYPHILIS AND GONORRHEA Reported by the State Department of Health to the Memphis Health Department, by Color. 1925-1929.

	Syphilis and Gonorrhea					
	Total		White		Colored	
Year	Cases Reported	Case Rate(a)	Cases Reported	Case Rate(a)	Cases Reported	Case Rate(a)
1925 ...	2,292	13.1	691	6.2	1,601	25.6
1926 ...	1,686	9.6	452	4.0	1,234	19.6
1927 ...	1,903	10.6	352	3.0	1,551	24.6
1928 ...	1,984	10.4	383	3.0	1,601	25.1
1929 ...	718	3.7	191	1.5	527	8.2

(a) Per 1,000 population.

The number of cases reported to the health department in 1929 was apparently incomplete since it was less than half the number of new cases (1,642) admitted to the venereal disease clinic in that year. If the figures for 1929 be omitted, the average case rate for syphilis and gonorrhea for the period 1925 to 1928 inclusive is 11 per 1,000 total population , four per 1,000 white population and 24 per 1,000 colored population.

The case rates for the total and the colored population are high; that for the white population seems to be average. Probably none of these rates represent the true incidence

of venereal disease in Memphis, for Usilton and Riley* in their survey of 1928 found the case rate for syphilis and gonorrhea in Memphis to be 20 per 1,000 total population, that for the white population 17, and that for the colored population 25.

The case rate for syphilis and gonorrhea among the white population of Memphis is exceeded by only two Tennessee cities: Chattanooga with a rate of 17.71, and Murfreesboro with a rate of 26.46, in the group surveyed by Usilton and Riley. Among the colored population the case rate for syphilis and gonorrhea is exceeded only by that of the colored population of Murfreesboro, with a rate of 48, according to the results of this survey.

Reporting.

In 1929, reports of a total of 727 cases of venereal disease (syphilis, gonorrhea and chancroid) occurring in Memphis were made to the Tennessee State Department of public health and transmitted to the Memphis Health Department. In the same year 1,642 new cases of venereal disease were admitted to the venereal disease clinic operated by the Memphis General Hospital and the Memphis Health Department. The large discrepancy between these two figures indicates that reporting to the state and thence to the Memphis Health Department of cases of venereal disease occurring in Memphis was inadequate in 1929. More complete reports were made in 1927 and 1928, as the comparison between cases reported and clinic admissions in Table XVI shows.

TABLE XVI.
VENEREAL DISEASE CASES REPORTED
Memphis Health Department and Venereal Disease Clinic Figures Compared, 1927-1929.

Veneral Disease	1927		1928		1929	
	Memphis Health Dept. (a)	Venereal Disease Clinic (b)	Memphis Health Dept. (a)	Venereal Disease Clinic (b)	Memphis Health Dept. (a)	Venereal Disease Clinic (b)
Total, all venereal diseases	2,020	2,082	2.071	1,740	727	1,642
Syphilis	1,454	1,471	1,670	1,165	646	1,073
Gonorrhea	449	481	314	445	72	397
Chancroid	117	130	87	130	9	172

(a) Total new cases reported by private physicians, clinics and hospitals in Memphis to the Tennessee State Department of Public Health, and subsequently reported to the Memphis Health Department.
(b) New cases admitted.

(*) Usilton, L. J. & Riley, W. D.—Venereal Disease Prevalence in Tennessee—Venereal Disease Information. U. S. P. H. S. 9, No. 10. Oct. 20, 1928.

There is closer agreement between the number of clinic cases of venereal disease and the cases reported to the Memphis Health Department in 1927 and 1928 than in 1929. But the total number of venereal disease cases includes cases under the care of private physicians and hospitals, as well as those admitted to the clinic. Therefore, the total cases reported in a given year should definitely exceed the cases admitted to the venereal disease clinic. Judged by this standard, reporting of venereal diseases seems to have been incomplete in 1927 as well as 1929.

The average case rate for the colored population for the period 1925 to 1928, 24 per 1,000, based on reports of cases to the Memphis health department, agrees closely with the rate of 25 for the colored population obtained by Usilton and Riley in their one-day census in January, 1928. The average case rate for the white population in 1925-1928 based on reports to the health department, was four: Usilton and Riley obtained a rate of 17 per 1,000 white population. Thus it would appear that cases of venereal disease are incompletely reported among the white population, while reports of cases among the colored are fairly complete. This is probably due to the fact that the majority of colored cases become patients of the venereal disease clinic, and reporting of cases admitted to this clinic is comparatively complete.

Clinical Service.

The medical staff of the venereal disease clinic is provided by the University of Tennessee Medical School. The clinic is part of the outpatient department of the Memphis General Hospital and is maintained by the hospital from its general funds. The Memphis Health Department employs a social worker who is assigned to the venereal disease clinic. Nursing assistance at the clinic is provided by the Memphis General Hospital. The venereal disease clinic holds sessions three mornings and four afternoons a week.

No follow-up service is provided by the health department for venereal disease cases except those occurring among prenatal cases and children. These cases are usually referred to the venereal disease clinic from the prenatal clinic.

The volume of service given by this clinic is very large. In 1929 a total of 21,535 registrants were treated; 1,642 of these were new cases and 19,893 old cases. The large proportion of old in comparison with new cases suggests that the file of the venereal disease clinic includes cases which are no longer active clinic patients.

The number of new patients registered at the venereal disease clinic indicates that the venereal disease clinic service is used adequately and with satisfactory frequency and

regularity. It is difficult to determine accurately the average number of clinic visits per case registered because of the probable overstatement by this clinic of the total number of clinic registrants. If a figure representing one-third of the new cases admitted be designated as the number of old cases, then the estimated total number of clinic registrants is 2,189, and the average number of visits per case 21. If the total number of clinic registrants recorded by the venereal disease clinic, 21,535, be accepted, the average number of visits per case is two. It seems probable that the former figure is more nearly correct than the latter, and the adequacy of use of the venereal disease clinic may be accepted. It is not possible to determine the adequacy of treatment separately for colored and white cases because of the incompleteness of the clinic records.

Wesley Institute, a voluntary social agency, has an adult clinic at which some venereal disease cases are treated. A few additional cases are treated at the Women's Clinic of Calvary Church. The number of venereal disease cases treated at these voluntary clinics is, however, negligible, the bulk of the venereal disease clinic service being given by the clinic at the Memphis General Hospital.

Follow-up of Cases.

The social worker of the venereal disease clinic follows up by letter active cases of venereal disease who cease their clinic visits. Two hundred and thirty-one visits with delinquents, the majority of which took place at the clinic, were made in 1929 by the social worker.

Complete data on the number of delinquent patients returning to the clinic for the year 1929 were not available. A sample of this experience was obtained by studying the cases for January, 1930. During this month 40 per cent of the cases delinquent in the preceding month returned to the clinic, whereas 60 per cent of these cases might be expected to return with adequate follow-up on the part of the clinic. This indicates the need for active follow-up of these cases by health department nurses.

Venereal disease cases are questioned by the social worker concerning contacts. The social worker visits the family of the patient urging the examination of all members at the clinic; in 1929, 113 visits to contacts were made. Some information is secured by the social worker in regard to sources of infection, but data on this point are inadequately recorded.

Appraisal Score.

The score of the Memphis Health Department in venereal disease control is 81 per cent. The major deficiency in this service lies in control practices. Delinquent cases

and sources of venereal infection require closer supervision than is given by the Memphis Health Department.

Recommendations.

It is recommended:

(1) That the director of the division of communicable disease of the Memphis Health Department supervise the department's program of venereal disease control, especially the clinical and follow-up service. The present arrangement by which the University of Tennessee Medical School provides medical service for the clinic should be continued. Centralization of supervision over this service in the health department is desirable, however, in order that the health department may be adequately and routinely informed concerning the clinic activities and thus enabled to direct the follow-up service.

(2) That cases of venereal disease occurring in Memphis be reported to the Memphis health department directly, rather than to the Tennessee State Department of public health.

That adequate reporting of cases treated by private physicians be secured by giving publicity to the state law which requires it.

(3) That the Memphis Health Department provide adequate nursing follow-up of venereal disease cases treated at the clinic and those referred by private physician.

(4) That a more aggressive attempt be made to locate and control sources of venereal infection.

(5) That the record keeping at the venereal disease clinic be modified so that clinic statistics may be tabulated by color.

TUBERCULOSIS CONTROL.

Tuberculosis is the chief public health problem of adult life in Memphis. Although mortality from tuberculosis is especially severe among the colored population it is also high among the white population. The control of tuberculosis is, therefore, a major responsibility of the public health agencies of Memphis.

The Memphis health department is especially fortunate in having the assistance of the Shelby County Tuberculosis Society in the development of its program of tuberculosis control. This society has made valuable contributions to the control of tuberculosis both in Memphis and Shelby County.

Medical Control of Tuberculosis.

Institutional Care.

Institutional care for resident cases of tuberculosis in Memphis and Shelby county is provided by the Oakville

Tuberculosis Sanatorium located in Shelby county. This institution is jointly owned by the city of Memphis and Shelby county.

The medical director of this sanatorium is appointed by the board of trustees which also guides its policies. (The board of trustees is appointed by the city and county commissions.) In addition to the medical director, the medical staff of the sanatorium consists of two full-time tuberculosis specialists and the part-time service (four half days weekly) of the staff physician of the Shelby County Tuberculosis Society.

Two hundred forty beds are available at the Oakville Tuberculosis Sanatorium for moderately advanced and advanced cases of tuberculosis, of which 40 are for colored patients. The average annual number of deaths from tuberculosis for the period 1927-1929 was 338; it is thus apparent that the number of beds is deficient, judged by the standard of two beds*, or even one bed, per annual death. Funds are available for the construction of 110 additional beds at this sanatorium but no provision has been made for the cost of maintenance.

The number of hospital patient days in 1929, 72,467, was 14 per cent below the amount of hospitalization which the high tuberculosis death rate indicates to be necessary. Eleven per cent of the cases admitted in 1929 were children under 12 years of age.

While an attempt is made to limit admission to residents, it is believed that many people suffering from tuberculosis come to Memphis from Arkansas, Mississippi and other sections of Tennessee, and establish residence in Memphis for the purpose of entering the sanatorium.

The inadequate sanatorium facilities and the high demand placed upon them by resident and non-resident cases of tuberculosis limits the number of incipient cases which can be cared for. Thus, many cases in the early stage become advanced cases before admission to the sanatorium is possible.

Clinical Service.

Clinical service for the diagnosis of tuberculosis is provided by the outpatient department of the Memphis General Hospital. The tuberculosis clinic is directed by the Oakville Sanatorium staff. Medical service is provided by a staff physician of the Oakville Tuberculosis Sanatorium, the director of child hygiene of the Shelby county health department, and the physician of the Shelby County Tuberculosis Society. The nursing staff is composed of three

(*) A standard which the National Tuberculosis Association approves and hopes to have generally accepted.

nurses, one each from the Memphis and Shelby county health departments and the Shelby County Tuberculosis Society. Clinic sessions are held twice weekly, one session being held for white patients, the other for colored patients.

The clinic patients are examined by the physicians without regard to source; that is, city patients may be examined by the county physician and vice versa. The nurses from each organization interview the patients after the medical examination and obtain such data as will enable them to make follow-up visits.

Beginning with January 1, 1930, a charge of $2.50 was made for each X-ray taken at the tuberculosis clinic. Indigent cases known to nurses of the health department or Tuberculosis Society are exempt from this payment on their recommendation.

In 1929, use of the tuberculosis clinic, indicated by the number of clinic visits made, was less than half of the amount expected in view of the number of cases of tuberculosis which exist in Memphis. A small increase in the total number of visits made to the clinic has taken place since 1926. The frequency of visits per case has remained stationary, and was somewhat below standard in 1929.

In 1926, 32 per cent of the new cases coming to the tuberculosis clinic were diagnosed as positive cases of tuberculosis. In the following year the percentage of positive cases decreased to 25 per cent, and in 1928 and 1929 the percentage of positive cases was 22 and 23 respectively. Only three cases diagnosed as positive in 1929 could be classified as cases in the early stage of tuberculosis.

An exact record of the number of contacts examined at the tuberculosis clinic is not kept; it is estimated, however, that about one contact is examined for each new positive case.

The magnitude of the tuberculosis problem in Memphis demands full use of clinical facilities for diagnosis. There is need for extension of these facilities and for stimulation of their maximum use by an intensification of case-finding and education of the public in the importance of early diagnosis.

Care of Contacts and Subnormal Children.

Care of the tuberculous child, and of children who are below standard physically, is an important measure in the prevention of adult tuberculosis. Facilities for the care of such children in Memphis are adequately provided for white children, but are not available, except to a negligible extent, for colored children.

Cheerfield Farm, a preventorium of 50-bed capacity, is operated by the Oakville Tuberculosis Sanatorium. Children are admitted to the preventorium after examination by the physician of the Shelby County Tuberculosis Society, who supervises them while there. In 1929, 27 new cases were admitted to Cheerfield Farm.

The Memphis board of education operates an open air school and in addition, one open air classroom; 201 white children attended the open air school in 1929. Admissions are made to this school after examination by the director of medical service of the Memphis health department. The school operates under a plan which gives the children a very healthful environment while doing their school work. They arrive at school in time to have a shower before breakfast; both breakfast and lunch are served at the school. The rest period of an hour is taken out of doors in good weather.

The open air classroom had an average attendance of 21 children (white) in 1929. Children are admitted to this classroom after examination and recommendation by the physician of the health department. Lunch is served at the school and the children have a rest period in the afternoon.

The Shelby County Tuberculosis Society operates two summer camps for tuberculosis contacts and children who are in poor physical condition. One camp is for white and the other for colored children. Seventy children attended the white camp, and 20 the colored camp, in 1929. Children are admitted to these camps only after examination by the physician of the Tuberculosis Society. An attempt is made to have physical defects corrected before the children go to camp. The camp children are vaccinated, immunized against diphtheria, and given a tuberculin test before entrance. The average length of stay is two months. The nurses of the Shelby County Tuberculosis Society are in residence at the camps during the months of July and August.

Nursing.

The registers of cases kept by the nurses of the Memphis health department and the Shelby County Tuberculosis Society were consulted to determine the number of cases being visited by these two groups of nurses. On December 31, 1929, 4,198 cases of tuberculosis were on the register of the Memphis health department. On December 31, 1927, a total of 2,703 cases, and on December 31, 1928, a total of 3,974 cases, were on this register. During the year 1927, the list of cases on the register of the nursing division

of the health department was revised, and a large number of cases were dismissed. The director of the nursing service stated that there was no plan in operation for dismissing tuberculous cases from the register. It seems probable that the number of tuberculosis cases on the health department register, which appears to have increased greatly since 1927, is due in part to an accumulation of cases which might be dismissed.

The register of the Shelby County Tuberculosis Society showed a total of 352 cases on December 31, 1929.

The tuberculosis register of the health department is fed by the records of deaths from tuberculosis made on death certificates. "Clean-up" visits are made by the nurses in the homes where deaths from tuberculosis have occurred. The data from these death certificates are transcribed by the director of the nursing division, in addition to her numerous administrative duties. Clerical assistance should be obtained for this work from the division of vital statistics, in order to hasten the follow-up visits to homes where tuberculosis contacts may need attention.

Tuberculosis nursing is provided as part of the generalized nursing service of the Memphis health department. The Shelby County Tuberculosis Society employs two tuberculosis nurses, one white and one colored, who do tuberculosis nursing except during the summer months when they are assisting at the society's camps. In 1929, these nursing services together made less than half the total number of nursing visits to cases of tuberculosis which the high death rate indicates to be necessary. The frequency of visits per case was also low compared with the standard requirements for home nursing service for the tuberculous.

The Memphis health department keeps no separate record of visit to post-sanatorium cases of tuberculosis. It is estimated, however, that a minimum of 116 visits were made by health department nurses to these patients in 1929. Additional visits, numbering 272, were made to post-sanatorium cases in 1929 by the nurses of the Shelby County Tuberculosis Society. These visits constitute only a fraction of the number required to give adequate supervision to arrested cases of tuberculosis in Memphis.

Appraisal Score.

The joint activities of the Memphis health department and the Shelby County Tuberculosis Society in the control of tuberculosis in 1929 receive a score of 53 per cent. The chief defects in this service are the inadequacy of clinic

facilities and their use, the insufficiency of nursing service for the tuberculous, and the failure to discover and hospitalize incipient cases.

Recommendations.

(1) It is recommended that the community program of tuberculosis control be centralized in a division of tuberculosis in the Memphis health department. The medical director of this division should give immediate supervision to the medical control of tuberculosis, and should co-ordinate the program of institutional care of the tuberculous.

In view of the special importance of tuberculosis as a cause of death among the colored population, the director of the division of tuberculosis should organize a comparative epidemiological study of tuberculosis in the white and negro races. The results of this study should serve as a guide in formulating an effective plan of tuberculosis control for the negro race.

The city should invite the co-operation of the state health department in their epidemiological study since the department is engaged in similar studies in rural areas and is planning to study another city as well.

(2) It is recommended that a nurse supervisor of tuberculosis be added to the nursing staff of the health department. The intensification of tuberculosis nursing by the health department resulting from this specialized supervision should permit the gradual assumption by the health department of the field nursing service now provided by the Shelby County Tuberculosis Society.

(3) Clinic facilities for the diagnosis of tuberculosis should be extended by increasing the number of clinic sessions or the number of clinic medical and nursing staff.

(4) The necessity for an increase in sanatorium facilities for white and colored patients, contemplated in the present building program, is imperative. Thought should be given to the provision of institutional facilities for the care of terminal cases, particularly among negroes.

(5) Adequate institutional facilities for the care of tuberculous negro children should be provided.

(6) It is recommended that nursing follow-up of tuberculous cases and contacts be improved by requiring the immediate, or weekly, reporting of deaths, admissions and discharges by the Oakville Tuberculosis Sanatorium to the Memphis health department.

(7) It is recommended that the system of record keep-

ing of the division of public health nursing be modified to include the recording of visits to post-sanatorium cases. A plan should be adopted for discharging closed cases of tuberculosis from the register.

(8) It is recommended that the Shelby County Tuberculosis Society devote its resources particularly to the education of the public in general hygienic measures which prevent tuberculosis, and in the importance of early diagnosis. The society's contribution to institutional care of substandard children, in summer camps, is valuable and should be continued. Its medical and nursing services, which are demonstrations nearing completion, should be gradually transferred to the Memphis health department.

MATERNITY HYGIENE.

The extent to which the health department must supervise the health of expectant mothers is indicated by the maternal mortality rate, the stillbirth rate, and indirectly, by the neonatal mortality rate. If these rates are favorable, an average amount of emphasis on medical and nursing care in the prenatal period will be sufficient. If they are high, they indicate the need for very active supervision of the expectant mother. The number of expectant mothers for whom the health department must provide clinic and nursing supervision will depend on the economic status of the community.

Maternal Mortality.

In comparison with the maternal mortality rate of the U. S. Birth Registration Area, the maternal mortality rate of Memphis is high. The average resident maternal mortality rate of Memphis in the five-year period, 1925-1929, was 8.9 per 1,000 live births. In the U. S. Birth Registration Area in the same period the maternal mortality rate varied between 6.4 and 6.9. The maternal mortality rates, by color, for Memphis and the U. S. Birth Registration Area are shown in Table XVII.

A comparison of these rates shows that maternal mortality among colored women is high in both the Registration Area and in Memphis. However, the excess of the maternal mortality rate among the colored over that of the white is greater in Memphis than in the Birth Registration Area. The maternal mortality among the white women of Memphis is, on the average, slightly above that of the white population of the Birth Registration Area. It is noteworthy that the mortality rate of the colored population of Memphis in

1929 was higher than in any year of the period 1924-1929, except 1926.

TABLE XVII.
MATERNAL MORTALITY, BY COLOR
Resident Population of Memphis and the U. S. Birth Registration Area
Compared, 1924-1929.

	Deaths from all puerperal causes per 1,000 live births					
	U. S. Birth Registration Area			Memphis (Residents only)		
Year	Total	White	Colored	Total	White	Colored
1924 ...	6.6	6.1	11.8	6.1	3.9	9.4
1925 ...	6.5	6.0	11.6	8.5	5.3	13.5
1926 ...	6.6	6.2	10.7	12.3	9.2	16.9
1927 ...	6.5	5.9	11.3	6.7	3.7	10.9
1928 ...	6.9	6.3	12.1	9.6	7.5	12.9
1929 ...	(a)	(a)	(a)	9.9	7.0	14.6

(a) Rates not yet available.

It is important to study the specific causes of maternal mortality among the white and colored population of Memphis in an attempt to explain the high mortality from puerperal causes among colored women, and in particular, the rise in maternal mortality in 1929.

Specific mortality rates from puerperal causes, by color, are shown in Table XVIII.

The death rate from puerperal septicemia among the colored population of Memphis shows marked annual variation. In spite of this fluctuation the trend of the death rate from this cause is upward for the colored population. Puerperal septicemia is a much less important cause of maternal deaths among white women. In 1929 the death rate from puerperal septicemia among resident white women was 1.3, among resident colored women 4.2, per 1,000 live births. There seems to be a slight downward trend in the death rate from puerperal septicemia among the white population of Memphis.

In the first four years of the period studied, 1924-1927, puerperal albuminuria was far more frequent as a cause of death among colored than among white women. In 1928 and 1929 the death rates in these two groups were practically the same. Thus the death rate from puerperal albuminuria has shown a downward trend among the colored population but has shown little variation among the white population.

Accidents of pregnancy and other accidents of labor

TABLE XVIII.

RESIDENT MORTALITY RATES FROM SPECIFIC PUERPERAL CAUSES, BY COLOR

Memphis, 1924-1929.

Cause of Death	1924			1925			1926			1927			1928			1929		
	Total	White	Colored	Total	White	Colored	Total	White	Colored	Total	White	Colored	Total	White	Colored	Total	White	Colored
All puerperal causes	6.1	3.9	9.4	8.5	5.3	13.5	12.3	9.2	16.9	6.7	3.7	10.9	9.6	7.5	12.9	9.9	7.0	14.6
Puerperal septicemia (146)	1.5	1.3	1.9	3.7	2.2	6.1	3.6	2.8	4.7	2.9	1.8	4.5	3.7	1.8	6.8	2.4	1.3	4.2
Puerperal albuminuria and convulsions (148)	2.8	0.9	5.6	1.8	0.9	3.4	3.6	1.8	6.1	1.6	0.0	3.9	1.3	1.3	1.3	2.1	2.2	2.0
Accidents of pregnancy (143)	1.0	0.9	1.3	1.6	0.9	2.7	1.6	0.5	3.4	0.0	0.0	0.0	2.7	3.5	1.4	2.2	0.9	4.2
Other accidents of labor (145)	0.0	0.0	0.0	0.3	0.0	0.7	1.6	0.9	2.7	1.1	0.5	1.9	0.8	0.5	1.4	1.9	1.3	2.8
Puerperal hemorrhage (144)	0.3	0.0	0.6	0.3	0.4	0.0	0.3	0.5	0.0	0.8	0.9	0.6	1.1	0.4	2.0	0.5	0.9	0.0
Other puerperal causes	0.5	0.8	0.0	0.8	0.9	0.6	1.6	2.7	0.0	0.3	0.5	0.0	0.0	0.0	0.0	0.8	0.4	1.4

were more serious causes of death among colored than among white women in Memphis in this period. There was a marked increase in deaths from these causes among the colored population in 1929, which explains in part the rise in the total maternal mortality rate in that year. Among the white population, however, deaths from accidents of pregnancy showed a marked decrease in 1929, in comparison with 1928.

The Stillbirth Rate.

The resident stillbirth rates of Memphis and the U. S. Birth Registration Area in the period 1924-1929 are shown in Table XIX.

TABLE XIX.
RESIDENT STILLBIRTH RATE
Memphis and the U. S. Birth Registration Area
Compared 1924-1929.

	Stillbirths per 100 Live Births					
	U. S. Birth Registration Area			Memphis (Residents only)		
Year	Total	White	Colored	Total	White	Colored
1924	3.9	3.6	7.6	6.0	3.6	9.4
1925	3.9	3.5	7.3	6.2	3.6	10.1
1926	3.8	3.5	7.3	6.0	3.8	9.2
1927	3.9	3.5	7.5	6.2	3.6	9.7
1928	(a)	(a)	(a)	5.8	3.2	9.8
1929	(a)	(a)	(a)	6.1	3.8	9.8

(a) Rates not yet available.

The total resident stillbirth rate of Memphis from 1924 to 1929 was about two points higher than the stillbirth rate of the U. S. Birth Registration Area in that period. This excess in mortality appears to be due to the high stillbirth rate among the colored population of Memphis, which is about two points higher than that of the colored population of the Birth Registration Area as a whole. The stillbirth rate of the white population of Memphis, on the other hand, is of approximately the same order as that of the white population of the Birth Registration Area.

Neonatal Mortality.

The neonatal mortality rate, or deaths of infants under one month of age, is also high in Memphis in comparison with the U. S. Birth Registration Area. In the period 1924-1929, the total neonatal mortality rate for Memphis varied between 42.0 and 59.8, that for white infants between 36.4 and 48.4, and that for colored infants between 51.2 and 81.1. In the U. S. Birth Registration Area, the total neonatal mortality rate in 1926 was 37.9, in 1927 36.1, rates which are

comparable to those of the white infants of Memphis. The maximum neonatal mortality rate of Memphis in the period 1924-1929 occurred in the year 1929. Thus, the rise in maternal mortality which took place in 1929 was accompanied by a proportionate increase in neonatal deaths.

The Indications of the Mortality of Maternity and Infancy.

The excessive maternal and neonatal mortality and the high stillbirth rate among the colored population indicates the need for extensive work in prenatal hygiene among the colored women of Memphis. The program should include adequate clinic and nursing supervision in the prenatal period. The possibility of improvement in maternal, fetal and neonatal mortality by adequate clinic care in the prenatal period has been demonstrated for many years by the Detroit department of health. In 1929, 56 per cent of the women attending its prenatal clinics were negroes, yet the maternal and neonatal mortality rates and the stillbirth rate of the prenatal clinic patients were reduced far below those of the city, exclusive of these patients. The stillbirth rate of the colored patients of the Detroit prenatal clinics was 4.1 per 100 live births, the neonatal mortality rate 33.7 per 1,000 live births, in 1929. The maternal mortality rate of all patients of these clinics in 1929 was only 2.88 per 1,000 live births.

The mortality rates also indicate the need for supervision, especially of colored women, at time of birth and in the postpartum period, in order to reduce deaths from puerperal infection and accidents of pregnancy and labor. In 1929, 57 of the 66 puerperal deaths* occurring in Memphis were reported from hospitals. Many of these deaths could not have been prevented, as many cases seek hospital care only in emergency. That high maternal mortality does not follow all hospital deliveries is suggested by the experience of the Detroit prenatal clinic cases referred to above. About 75 per cent of the 2,575 prenatal clinic cases were delivered in Detroit hospitals in 1929. Yet the maternal mortality rate of all clinic cases was only 2.88 per 1,000 live births. Thus, adequate care in the prenatal period may do much to offset the risk incurred through hospitalization.

Obstetrical Service.

A large number of births occurring in Memphis are hospitalized. In the year 1929, 55 per cent of the total births occurred in hospitals, 67 per cent of the white births and 38 per cent of the colored births being hospitalized. The num-

(*) Figures from the Tennessee State Department of Health. Residents and non-residents are included.

ber of births occurring at home has decreased as the hospitalization of births has increased. This is shown in Table XX.

The number of births attended by midwives is small. In 1929, 149, or about four per cent of the total resident births, were attended by midwives. The majority of the cases delivered by midwives were colored women.

Midwives practice only it they possess permits issued by the health department, and the number of these permits being issued is decreasing annually. In 1919, 75 midwives were given permits to practice by the health department; in 1929, the number was reduced to 24. The practice of the health department is to control the work of the old midwives and restrict the number of new permits issued to young women. Monthly meetings are held for the midwives, at which a colored nurse gives instructions, with occasional assistance from a white nurse. The midwives bring their bags for inspection and are also visited in their homes by the nurses.

A total of 791 mothers were registered at least three months before delivery with the nursing service of the health department. This number constitutes 45 per cent of the births occurring at home in 1929. The majority of those registered early were colored. Twenty-three per cent of the white mothers delivered at home were rgistered at least three months before delivery, while 62 per cent of the colored mothers were registered by this period.

Clinical Service.

Clinic care of prenatal cases is made available by the outpatient service of the Memphis General hospital co-operating with the Memphis health department. The medical staff of the clinic is supplied by the Memphis General hospital. A urinalysis is made by a physician before the patient comes into the clinic; the blood pressure is taken by the clinic physician. Patients are referred to the venereal disease clinic for the Wassermann test. Note is made of the condition of the legs, and special advice concerning diet is given if swelling exists. Two nurses from the health department give instruction in prenatal hygiene. The prenatal clinic is held three afternoons a week for colored patients, and one morning a week for white patients.

A total of 1,816, or 46 per cent of the total births occurring in 1929, were registered at the prenatal clinic of the health department in that year. Three hundred forty-six, or 16 per cent of these patients were white, and 1,470, or 84 per cent colored. While the number of patients regis-

TABLE XX.

RESIDENT BIRTHS, BY PLACE OF OCCURRENCE AND ATTENDANT AT DELIVERY, BY COLOR

Memphis, 1924-1929.

Year	Total Births			Births in Hospital						Births at Home Attended By:											
				Total		White		Colored		Physicians						Midwives					
										Total		White		Colored		Total		White		Colored	
	Total	White	Colored	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent
1924	4167	2419	1748	1772	42.5	1129	46.7	643	36.8	1922	46.1	1248	51.6	674	38.6	473	11.4	42	1.7	431	24.6
1925	3986	2357	1629	1667	41.8	1162	49.3	505	31.0	2004	50.3	1166	49.5	838	51.4	315	7.9	29	1.2	286	17.6
1926	3875	2256	1619	1786	46.1	1231	54.6	555	34.3	1841	47.5	1002	44.4	839	51.8	248	6.4	23	1.0	225	13.9
1927	3966	2252	1714	2035	51.3	1327	58.9	708	41.3	1717	43.3	903	40.1	814	47.5	214	5.4	22	1.0	192	11.2
1928	3967	2349	1618	2066	52.1	1403	59.7	663	41.0	1745	44.0	929	39.6	816	50.4	156	3.9	17	0.7	139	8.6
1929	3958	2375	1583	2191	55.3	1594	67.1	597	37.7	1618	40.9	770	32.4	848	53.6	149	3.8	11	0.5	138	8.7

tered at the prenatal clinic meets the general standard, the number of visits made by these patients is inadequate. The average number of visits made by both white and colored patients was approximately 2.6, whereas a minimum of five visits to the prenatal clinic would seem to be necessary if medical supervision is to be effective. Furthermore, this minimum should be exceeded in Memphis, where the high incidence of syphilis among the colored population makes early medical supervision imperative.

The adequacy of the clinic service for prenatal cases in Memphis may be measured also by determining the percentage of cases registered at the prenatal clinic in the sixth month of pregnancy, or earlier. In 1929, 52 per cent of the white prenatal clinic cases, and 58 per cent of the colored prenatal clinic cases, were registered at least by the sixth month of pregnancy. Thus, slightly over half of the cases attending the prenatal clinic are receiving adequate prenatal care. However, marked progress in prenatal clinic attendance has been made since 1926, when only a third of the prenatal cases were registered by the sixth month of pregnancy, or before. A comparison of white and colored prenatal cases by the month of pregnancy in which they registered at the clinic in 1926 and 1929, is given in Table XXI. These data were compiled for use in the survey by the supervisor of prenatal nursing of the health department.

TABLE XXI.

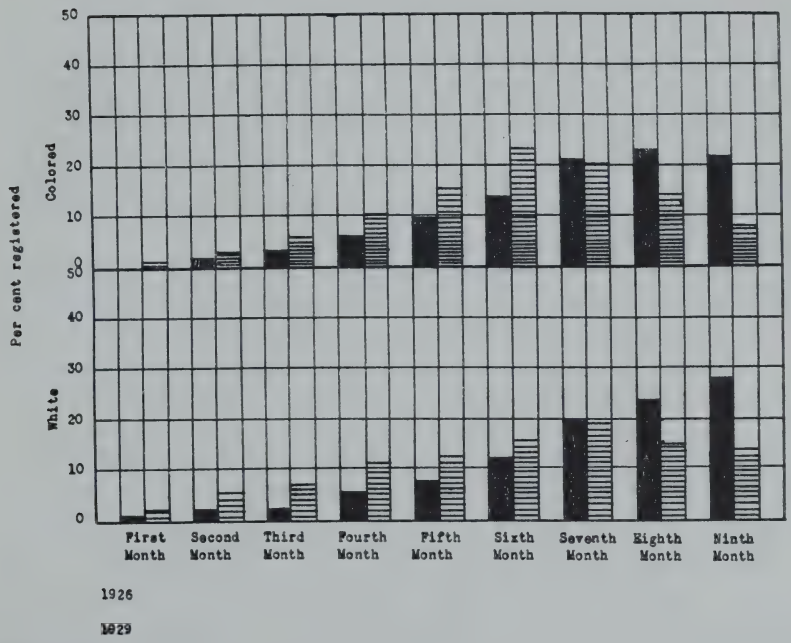
PRENATAL CASES, CLASSIFIED BY MONTH OF PREGNANCY IN WHICH CLINIC REGISTRATION OCCURRED MEMPHIS 1926 AND 1929 COMPARED.

Month of Pregnancy	White Patients Registered at the Prenatal Clinic				Colored Patients Registered at the Prenatal Clinic			
	1926		1929		1926		1929	
	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.
Total all cases	220	100.0	340	100.0	638	100.0	1,054	100.0
1st month	2	0.9	6	1.8	0	0	11	1.0
2d month	4	1.8	19	5.1	9	1.4	31	2.9
3d month	5	2.3	23	6.8	19	3.0	59	5.6
4th month	11	5.0	37	10.9	37	5.8	106	10.1
5th month	16	7.3	41	12.1	61	9.6	161	15.3
6th month	26	11.8	53	15.6	88	13.8	244	23.2
7th month	43	19.5	65	19.1	136	21.2	213	20.1
8th month	52	23.6	50	14.7	150	23.5	147	13.9
9th month	61	27.8	46	13.5	138	21.6	82	7.8

Approximately 25 per cent more patients registered at the prenatal clinic in the sixth month of pregnancy, or earlier, in 1929 than in 1926. It is of interest that about

five per cent more colored than white patients had registered by the sixth month of pregnancy in both 1926 and 1929.

PER CENT OF PRENATAL CASES REGISTERED WITH CLINIC BY MONTH OF PREGNANCY, BY COLOR, MEMPHIS, TENN., 1926-1929 COMPARED



Nursing Service.

The total number of white and colored prenatal cases under supervision of the nurses of the health department appears to have been adequate in 1929. The number of nursing visits per case, however, was below standard. The average number of visits to both white and colored patients in 1929 was 4.4, the average number of visits to white patients being 3.3, and to colored patients 4.9.

Appraisal Score.

The activities of the Memphis Health Department in maternity hygiene in 1929 scored 93 per cent. This represents the result of a program adequately planned and, on the whole, effective in relation to the needs of the average community. However, clinical and nursing services were somewhat below the amount required by a population in while maternal and neonatal mortality and stillbirths are above the average.

Recommendations.

(1) It is recommended that consideration be given the revision of the birth certificates for Memphis and Shelby county to include questions regarding prenatal care, as follows:

a. Was labor normal or operative
b. Was baby asphyxiated; if so, was it mild, moderate or severe
c. At what period of pregnancy did the patient first come under your care.

It is suggested that the revision of the birth certificate to incorporate these questions be referred to the Shelby County Medical Society and the Tennessee state department of public health. It is recognized that these items are in advance of present practice and may require several years for accomplishment. They are enumerated here primarily to stimulate interest.

(2) It is recommended that prenatal cases be urged to attend the prenatal clinic earlier in pregnancy in order that syphilitic prenatal cases may receive early treatment.

(3) It is recommended that nursing service to prenatal cases be increased.

(4) It is recommended that hospitals be urged to study their maternal mortality in relation to the amount of prenatal supervision of the cases delivered. Such an analysis should contribute to the reduction of the high maternal and neonatal mortality rates and stillbirth rates.

INFANT HYGIENE.

The resident infant mortality rate of Memphis, like the maternal mortality rate, is high, the average rate for the five-year period, 1925-1929, being 98 per 1,000 live births, while the infant mortality rate for 42 states of the U. S. Birth Registration Area in 1929 was 67. The average infant mortality rate among white infants in the period 1924-1929 was 73, and among colored infants 135. The mortality rate of white infants is, thus, on the average, lower than that of colored infants, and of the same order as the infant mortality rate of northern cities in which the number of the colored population is negligible. The rise in the infant mortality rate in 1929 affected both white and colored infants, resulting in a rate of 80 among white and 141 among colored infants.

The infant mortality rate shows a tendency to fluctuate from year to year. For example, the total infant mortality rate in 1927 was 85; in the preceding year the total rate was 102; in 1928 the rate was 89; in 1929 the rate in-

creased to 103. This tendency to fluctuate is apparent in both white and colored infant mortality rates.

The resident infant mortality rates for Memphis for the period 1924-1929 are summarized in Table XXII.

TABLE XXII.
RESIDENT INFANT MORTALITY RATES,
Memphis, 1924-1929.

Year	Resident live births			Deaths of Infants under one year			Infant Mortality rates (a)		
	Total	White	Colored	Total	White	Colored	Total	White	Colored
1924	3,932	2,334	1,598	427	165	262	108.6	70.7	164.0
1925	3,754	2,275	1,479	407	158	249	108.4	69.5	168.4
1926	3,656	2,174	1,482	374	175	199	102.3	80.5	134.3
1927	3,736	2,174	1,562	317	152	165	84.9	69.9	105.6
1928	3,751	2,277	1,474	335	151	184	89.3	66.3	124.8
1929	3,730	2,288	1,442	385	182	203	103.2	79.5	140.8

(a) Deaths of infants under one year per 1,000 live births.

The specific causes of infant mortality in Memphis in 1924-1929 are shown in Table XXIII. A study of the specific infant mortality rates shows that the leading cause of infant deaths in Memphis is the natal and prenatal group, including deaths from congenital malformations, congenital debility, premature birth, and other diseases peculiar to early infancy. Deaths from these causes are high among both white and colored infants, but the rate among the colored has exceeded the rate among the white since 1924. In four of the six years since 1924, the infant death rate from natal and prenatal causes among white infants has varied between 40 and 45 per 1,000 live births; in two years of this period, the rate reached 51 and 60. Among colored infants, in four of the six years since 1924, the infant mortality rate from natal and prenatal causes varied between 55 and 72; in the remaining two years, this rate was 46 and 50. In the year 1929, the death rate from natal and prenatal causes among white infants was 60, and among colored infants 73.

The cause of death second in importance to the natal and prenatal group varies from year to year for white infants. Diarrhea and enteritis, deaths from respiratory causes, and deaths from the epidemic diseases, each constituted the second most important cause of death for two years of the period 1924-1929. Among colored infants, deaths from the respiratory causes form, on the average, the cause of death second in importance to the natal and prenatal group. While the death rate from diarrhea and

enteritis among colored infants is much higher than that for white infants, it is exceeded quite definitely by the respiratory death rate among colored infants.

It is important to determine the period during the first year of life in which the highest infant mortality occurs. The classification of infant deaths by week and month of death was available in the records of the health department for total infant deaths only, without regard to residence. The infant mortality rates for resident and nonresident infants by certain subdivisions of the first year are given in Table XXIV. The total infant mortality rates presented here necessarily differ from those given in Table XXIII, which are based on resident infant deaths.

The implications of the mortality rates presented in this table are most significant in determining the activities of the Memphis Health Department in both prenatal and infant hygiene. The death rates of both white and colored infants in the first week and first month of life are very high and show no tendency to decline. Indeed, these rates reached their maximum for the period 1924-1929 in the year 1929.

It is significant that neonatal mortality among the white infants of Memphis exceeds the mortality in the first to the twelfth month; among colored infants the mortality rate of the last 11 months is higher than that of the first month for each year of the period 1924-1929 except 1929.

The specific infant mortality rates by age confirm the indications of the specific infant mortality rates by cause, that is, that natal and prenatal causes are responsible for the largest number of infant deaths in Memphis. The relative importance of neonatal deaths is greater among white than among colored infants, but the magnitude of the neonatal rate among colored infants suggests the great importance of careful prenatal supervision and adequate obstetrical care for both white and colored women.

In 1929, 183 of the 262 neonatal deaths* occurring in Memphis took place in hospitals. This fact suggests the importance of studying both maternal and neonatal hospital deaths in relation to the amount of prenatal care of the mother.

Clinical Service.

The clinic care for infants in Memphis is provided co-operatively by the Memphis General Hospital and the Memphis department of health. During part of the year 1929, the director of the bureau of medical service of the

(*) Figures from the Tennessee State Department of Health. Resident and non-resident deaths are included.

TABLE XXIII.

RESIDENT INFANT DEATHS FROM SPECIFIC CAUSES PER 1,000 LIVE BIRTHS

Memphis, 1924-1929.

Cause of Death	1924			1925			1926			1927			1928			1929		
	Total	White	Colored	Total	White	Colored	Total	White	Colored	Total	White	Colored	Total	White	Colored	Total	White	Colored
All causes	108.6	70.7	164.0	108.4	69.5	168.4	102.3	80.5	134.3	84.9	69.9	106.6	89.3	66.3	124.8	103.2	79.5	140.8
Natal and prenatal causes (159-162)	54.4	42.5	72.0	47.9	40.0	60.2	52.3	50.6	54.7	44.8	43.7	46.1	46.1	43.9	49.5	65.1	60.3	72.9
Respiratory diseases (99-101)	14.0	5.1	26.9	18.4	7.0	35.8	12.3	10.6	14.8	12.0	6.4	19.9	12.5	6.6	21.7	10.2	3.1	21.5
Epidemic diseases (1-42)	8.4	5.1	13.1	12.0	6.2	21.0	16.7	7.4	30.4	12.3	8.3	17.9	12.5	6.1	22.4	11.5	7.4	18.0
Diarrhea and Enteritis (113)	15.5	10.3	23.2	14.7	7.5	25.7	11.2	7.8	16.2	5.6	3.7	8.3	8.3	4.4	14.2	3.8	1.7	6.9
All other causes	16.3	7.7	28.8	15.4	8.8	25.7	9.8	4.1	18.2	10.2	7.8	13.4	9.9	5.3	17.0	12.6	7.0	21.5

TABLE XXIV.

INFANT MORTALITY RATES BY CERTAIN SUBDIVISIONS OF THE FIRST YEAR

Memphis, 1924-1929.

Year	Deaths per 1,000 live births at specified ages.											
	Under 1 year			Under 1 week			Under 1 month			1-12 months		
	Total	White	Colored	Total	White	Colored	Total	White	Colored	Total	White	Colored
1924	106.8	69.9	166.1	40.3	30.0	56.8	51.3	36.5	75.1	55.5	33.4	91.0
1925	105.5	68.8	172.6	36.4	28.7	50.5	47.9	36.4	69.0	57.6	32.4	103.6
1926	97.2	72.7	141.2	35.0	33.1	38.6	45.8	37.4	60.8	51.4	35.3	80.4
1927	81.4	64.5	109.7	35.6	32.8	40.2	42.0	36.4	51.2	39.4	28.1	58.5
1928	89.6	68.0	128.0	36.2	31.7	44.4	43.2	37.4	53.4	46.4	30.6	74.6
1929	94.3	72.1	135.8	49.5	45.7	56.7	59.8	48.4	81.1	34.5	23.7	54.7

Memphis health department acted as medical director of the postnatal and well-baby clinics. When the department became understaffed through the resignation of one of its medical members, it became impossible for the health department to send a physician to these clinics regularly. Because of this shortage of personnel about three-fourths of the infant welfare clinics in 1929 were held by the health department nurses without medical supervision.

A postnatal clinic is held weekly, and a well-baby clinic twice a week, once for white infants and once for colored infants.

Following delivery, each mother under the supervision of the nursing service of the health department is given a card reminding her of the necessity of visiting the postnatal clinic six weeks later. An attempt is thus made to interest the mothers early in the health supervision of their infants.

Two nurses are in attendance at this clinic. They weigh the infant, examine the umbilicus, external genitals and mouth. Breast feeding is urged if it is possible. Infants suffering from malnutrition, and difficult feeding cases, are referred to the pediatric clinic of the Memphis General hospital. The infant is given a Wassermann test if the mother has shown a four-plus reaction. The nurse recommends the use of orange juice or tomato juice for infants having normal elimination. Sunlight is recommended but no definite instructions are given about time of exposure. No literature is distributed to the mothers at this clinic. The mothers are instructed to return to the well-baby clinic in a month, or sooner if the infant needs supervision.

A small number of infants are brought to the clinics of the Cynthia Milk Fund raised by the Press-Scimitar, a local newspaper, and administered by the director of medical service of the health department. The average annual expenditure of this fund is $4,000, which is used to buy milk. These clinics are held weekly at the health department during the winter, and weekly in five public schools in the summer months. Tickets are distributed at these clinics which entitle the holder to free milk daily. The mothers are given instruction in infant hygiene by the nurse supervising these clinics. During the summer, a physician is in attendance twice a month at the clinics held in the schools. No records except those permitting a check of milk received are kept at the Cynthia Milk Fund Clinics. In 1929, the average registration of infants under one year at these clinics was estimated to be 75.

The number of infants visiting the postnatal and well-baby clinic is very small. Only one-tenth of the white infants, and about one-third of the colored infants, which require supervision from the health department, were seen at these clinics in 1929. The clinic service for infants is also inadequate in intensity, the infants registered in 1929 making, on the average, only one visit.

In March, 1929, the Baptist Good Will Center established a Baby Clinic. About 30 infants under one were treated at this clinic in 1929; these infants made an average of two visits during the first year. This clinic is held weekly, and a volunteer physician is in regular attendance. The health department nurse assigned to this district gives nursing supervision to this clinic.

Nursing Service.

The nursing service for infants is superior in volume and quality to the clinical service. The total number of nursing visits to colored infants in 1929 was well above the standard for colored infants, although the number of nursing visits to white infants was slightly below standard. The number of nursing visits per infant was proportionately greater among the colored.

Baby Boarding Homes.

Baby boarding homes are not licensed or inspected by the health department. Infants of mothers from the Bethany Training Home and the Beulah Home attend the health department clinics. The Ella Oliver Home has no supervision by the health department; however, it has an obstetrician and a trained nurse on its staff.

Appraisal Score.

The activities of the Memphis health department in infant hygiene in 1929 scored 49 per cent. The major deficiency of the service was the lack of adequate medical clinic care, due to the temporary absence of a medical director of child hygiene on the health department staff.

Recommendations.

(1) It is recommended that the position of medical director of the division of child hygiene of the health department be filled immediately, so that adequate medical supervision of the program of maternity and infant hygiene may be provided.

(2) The high neonatal mortality rate indicates the need for intensive prenatal care as a means of reducing infant deaths in the first month.

PRE-SCHOOL HYGIENE

Clinical Service.

There is no organized clinical service for preschool children in Memphis. The parent-teacher association has stimulated a program for the examination of children entering school. During the summer of 1929, preschool clinics were held in 17 schools for the examination of children about to enter school. These children were given a thorough physical examination, at the rate of five to six per hour. The number of children enrolled in the first grades of the public schools in June, 1929, was 6,186; it is estimated that an additional 300 children were registered in the first grades of the parochial schools. Out of this group of approximately 6,500 first grade children, 470, or seven per cent, were given physical examinations before entrance to school in 1929.

The Press-Scimitar, a local newspaper, finances the Cynthia Milk Fund Clinics which the health department supervises throughout the year. These clinics have been referred to in the preceding section on infant hygiene. During 1929, about 50 children of preschool age were registered at these clinics. Tickets for milk are issued to the mothers whether or not the child is present; the 50 children registered, therefore, did not make weekly visits. No record of the actual number of visits made is available. An attempt is made to have the children who come to the Cynthia Milk Fund Clinics immunized against diphtheria. One hundred of the Cynthia Milk Fund children, presumably all of the preschool children, and some infants under one year, were immunized in 1929. During the summer months a physician is in attendance at the clinic every two weeks and a small number of physical examinations are given. No record of the number or results of the physicial examinations was made, however, and it is not possible, therefore, to include them with the examinations of preschool children at the summer round-up clinics.

Nursing Service.

It is estimated that there are about 20,000 children between the ages of one and five years in Memphis; of this number 7,653 were registered with the nursing service of the health department in 1929. This number is about eight per cent in excess of the number requiring nursing supervision by a public health agency. The children registered, however, received only one-half as many nursing visits per child as is necessary for adequate supervision.

Appraisal Score.

The preschool hygiene activities of the Memphis health department in 1929 received a score of 45 per cent. The chief inadequacy of the preschool service is the lack of clinic supervision of preschool children and the incompleteness of the program for physical examination of school entrants.

Recommendations.

(1) It is recommended that the health department secure the co-operation of the parent-teachers association, the board of education, and the private physicians of Memphis, in an effort to secure a larger number of examinations of children entering school. It seems desirable to distribute the burden of the examination of these children among private physicians rather than to increase the medical staff of the health department to provide adequately for this work.

(2) It is recommended that the Cynthia Milk Fund clinics be developed into well organized preschool clinics. Adequate records of cases attending should be kept; record forms should be used for physical examinations.

(3) The mental hygiene of the preschool period should be supervised by making available the facilities of a child guidance clinic.

SCHOOL HYGIENE

There are 24 public elementary schools for white children, 14 public elementary schools for colored children, and seven parochial schools in Memphis. The total enrollment of these elementary schools in June, 1929, was 35,146; about 60 per cent of this number were white children and the remaining 40 per cent, colored children. Health service for school children is under the direction of the health department. The director of the bureau of medical service supervises the school hygiene work and gives some of the physical examinations. He is assisted by two part-time school physicians. A supervisor of school nursing supervises school nursing which is carried on as part of the generalized nursing program.

Health Examination.

The school hygiene program provides for the physical examination of all white children in the first, third, and fifth grades. No physical examinations are made in the colored schools. The actual number of examinations of white children of the first and fifth grades, however, was

far below the total registration in these grades in 1929. About one-third of the first grade children, and slightly less than half of the fifth grade children, were examined in 1929. If the number of preschool examinations be added to those of first grade children the percentage of first grade children examined is increased from 32 to 39. But an adequate program should provide for the examination of 75 per cent of the first grade children.

The insufficient number of children examined is due to the fact that the division of medical services was understaffed during most of the year 1929. This has limited the amount of medical service for children of all ages.

Additional health examinations of 1,064 children in other grades were made in 1929. This total includes 350 examinations of children attending the open air school, who are examined twice yearly by the director of medical service. The director of medical service also examined 704 school children seeking working permits.

The parents are not invited to be present at the physical examinations of school children. In 1929, about 82 parents attended the examinations, but their attendance was voluntary. No special effort is made to secure the attendance of parents, since the time of examinations of school children is limited by the small number of medical examiners, and attendance of parents tends to increase the time spent on the examination of each individual child.

A measure of the success of the follow-up physical examinations of school children is the number of physical defects corrected. It is estimated that 75 per cent of the children in the first and sixth grades should visit a dentist during the year. Only three per cent of the children in the Memphis schools were known to have visited a dentist in 1929. The number of corrections of defects of vision, hearing, and heart function and of tonsillectomies, was so small as to be negligible. This lack of correction of defects may be explained in part by the fact that only about half the number of nursing visits were made to school children in 1929 which an adequate school nursing program requires.

Dental Hygiene.

The dental hygiene program, which is operated in the white schools only, is under the direction of the division of dental hygiene, the staff of which consists of the director and an assistant who are dentists, and a public health nurse assigned as a full-time assistant. A total of 2,039 white patients were treated by the dentist in 1929. Eighteen hundred thirty-four prophylactic treatments were given, 1,958 teeth extracted, and 3,361 teeth filled in 1929. While the

total volume of work done seems large, the amount of dental work among first and fifth grade children is small in comparison with the amount which children in these grades require.

A dental clinic is operated also by Wesley Institute, a voluntary social agency. This clinic is held twice a month, and free service is given to indigent white children by a volunteer dentist. It is estimated that 175 children attended this clinic in 1929, most of which had extractions performed.

Children who need fillings and other kinds of dental treatment are referred to the dental clinic of the University of Tennessee Dental School. This clinic is usually open only during the school term, but it was held also during the summer, in 1929. It is reported that the cost of treatments, which is placed at a minimum, is still high enough to limit the number of children who can afford to seek treatment at this clinic. There are no public dental facilities for negroes in Memphis.

Health Control.

The classroom teachers in the elementary schools do not make morning inspections of school children in order to detect symptoms of communicable disease. The nurses in the white elementary schools inspect the children three times a year for the detection of skin disease; in the colored schools, this inspection is made four times a year in the upper grades and once a month in grades one to three. Very little pediculosis, scabies or conjunctivitis, is found among the white children, but there is a large amount of skin disease among the colored children. Thus, 293 white children and 321 colored children suffering from skin disease were reported in 1929. The colored nurse is permitted to treat certain mild skin dseases among colored children in the school.

Children in the white schools are weighed twice a year. Children in certain colored schools are also weighed twice a year, but four of the 14 colored schools have no scales. Theoretically, reports of weight are made monthly to parents, but actually, monthly weighing is carried on in few schools.

Health Education.

A course of study in health education has been formulated for the primary grades. This program requires that 20 minutes weekly in grades one and two, and a half hour weekly in the third grade, be devoted to health instruction. There is no course of study in health education for the intermediate grades. A course of study for grades four, five and six, is at present being planned and will be available

in tentative form in September, 1930. In the second semester of the fourth year and the first semester of the sixth year, a definite period is assigned to health instruction based on a text book.

Most grades make health posters and do practical health work built around the development of health habits. In three schools special demonstrations were held in 1929; the children followed the growth of animals, making this the basis for practical health study.

Sanitation.

The chief engineer of the board of education makes an annual sanitary inspection of school buildings, but the health department has made no sanitary inspection of school buildings for seven years. All schools are provided with drinking fountains which are not, however, of the approved sanitary type. Lavatory facilities are adequate in a third of the schools, and towels and soap are provided in a fifth of the schools.

Recreation.

The Memphis park commission has a recreation department which supervises recreation in the parks and on certain of the school playgrounds after school hours. Recreation activities for children after school hours were supervised by the recreation department in 21 white public schools two negro public schools, and two parochial schools in 1929. During the summer months, the program of 16 white playgrounds and six negro playgrounds was supervised. The total attendance at the playgrounds in 1929 was 770,151 white children and 127,550 colored children. Additional supervision is given to the recreation activities of community centers, institutions and special organizations. The Memphis park commission also has supervision over two municipal swimming pools.

Although the recreation activities seem to be well supervised there is a lack of adequate play space for school children. Only one-fourth to one-fifth of the elementary schools have four acres of playground space per school; all of the high schools have at least six acres of playground area. The board of education has in many instances purchased additional land to enlarge playgrounds and is providing adequate playground space for all new buildings.

Appraisal Score.

The activities of the Memphis health department and the board of education in school hygiene received a score of 32 per cent in 1929. This service was the most inadequate of all major health activities, with the exception of control

of cancer and heart disease. The chief defects in the school hygiene program are lack of adequate follow-up of school children having physical defects, and an incomplete development of health education. (The latter is being introduced into the curriculum more widely in the current year.)

Recommendations.

(1) It is recommended that a negro physician on part-time be added to the health department staff so that a program of school medical examinations may be introduced in the colored schools.

(2) It is hoped that the volume of examinations of first grade children to be made by school physicians will be reduced by the successful transfer of responsibility for examination of school entrants to private physicians.

(3) It is recommended that closer follow-up of children with defects be made to secure a larger number of corrections. This may be brought about by

a. Securing the attendance of parents at the examinations of school children;
b. The extension of school nursing service and increase in its volume;
c. Creating interest among the teachers in the importance of correction of defects of children in their classrooms.

(4) It is recommended that a colored dentist be added to the staff of the health department to operate a dental hygiene program in the colored schools, and also that the dental program for colored children be planned to include the treatment of dental defects.

(5) It is recommended that the course in health education being developed by the board of education be introduced into the school curriculum as soon as possible. There is great necessity for proper education of school children in health habits and knowledge, particularly as an aid to the control of communicable disease. An appreciation of the use of such physical equipment as lavatory facilities on the part of the school children will contribute to the willingness of the board of education to provide them, as it has done in school buildings recently constructed.

INDUSTRIAL HYGIENE

A study of the public health activities of a community should include within its scope the effort on the part of industry to maintain the health of its employes. The Memphis chamber of commerce was consulted concerning such a study of industrial hygiene in Memphis, and the director

of its industrial division co-operated by sending a questionnaire to 150 manufactories of Memphis. The scope of the questions was limited in the hope that a greater number of questionnaires would be returned if it were kept short. In addition to this group of manufactories, the questionnaire was sent to the large department stores and public utilities companies.

A total of 78 companies returned the questionnaire on industiral hygiene. These companies together employed a total of 10,158 men and 3,407 women. Fifty-six companies answering the questionnaire employed 50 or more; 22 companies employed less than 50.

Only one company reported a full-time physician in charge of the health of its employes; 25 companies reported that the part-time services of one or more physicians were available to their employes. Two additional companies reported the use of physicians only in cases involving compensation under insurance.

Six companies reported that they employed full-time industrial nurses, and eight companies reported the employment of part-time nurses.

A physical examination on entrance was required by 11 companies employing a total of 4,974 men and women. These companies comprised two department stores, two dairies, one automobile factory, two public utilities companies and four miscellaneous factories. Periodic health examinations were required by six companies, employing a total of 2,292 men and women. Five of these companies were included in the group which required physical examinations on entrance. Smallpox vaccination on entrance was required by five companies.

Fifty-five companies reported that they carried on educational work in accident prevention. This work is fostered by the safety division of the Memphis Chamber of Commerce. This division, through its industrial safety section, sponsored ten educational rallies for industrial employes in 1929. The average monthly attendance at these meetings was 810.

FOOD AND MILK CONTROL

Control of Food and Drugs.

The control of the health of foodhandlers and the sanitary condition of food establishments is under the direction of the division of food and drugs of the bureau of sanitation. The staff of this division consists of a director and three food inspectors. Late in 1929, seven sanitary inspec-

tors took over the work of food inspection in their districts, leaving the full-time food inspectors for concentrated inspection service in the downtown area.

During 1929 the bureau of sanitation was reorganized; with this reorganiztion came the establishment of several new policies relating to food control. In August, 1929, a notice was sent to all foodhandling establishments announcing that the health department would demand the maintenance of sanitary conditions in foodhandling establishments and would require the provision of running water and sinks. As a result of this policy, 125 establishments were ordered to install running water and 75 of these complied with the order. In September, 1929, a policy was announced with regard to the issuing of permits to foodhandling establishments. It was agreed that the city license department would not grant a license to the operator of a foodhandling establishment until the health department had issued a food permit to the operator. On December 31, 1929, a total of 1,866 food establishments were operated under food permits issued by the health department.

A total of 10,778 inspections of foodhandling establishments were made in 1929, a number which exceeds that required in a city of this size.

The food inspectors do not instruct foodhandlers in personal hygiene or the hygiene of foodhandling.

Milk Supply Control.

Milk control is under the division of milk control of the bureau of sanitation. There are five milk inspectors in this division in addition to the director.

The milk supply of Memphis is obtained from eight counties of Tennessee and Mississippi. The most distant dairy supplying milk to Memphis is 65 miles from the city. Thus, the question of deterioration of the milk supply during transportation from the milk shed is of slight importance here.

In September, 1928, Memphis adopted the standard milk ordinance; this ordinance was enforced beginning with February 1, 1929. In August, 1929, a survey* of the dairy farms and milk supply was made in order to measure the improvement of the milk supply since the standard milk ordinance was adopted. This resurvey showed very definite improvement in milk sanitation and in the bacteriological content of the milk supply. During the period from February to August, 1929, the amount of pasteurized milk increased

(*) Graves, L. M., M. D., "Local Milk Control," 18th Annual Convention, International Association of Milk and Dairy Inspectors, Memphis, October, 1929.

from 57 to 67 per cent of the total supply. Thirty-two per cent of the milk supply is used raw and one per cent or less is certified.

There are seven pasteurizing plants in Memphis, two of which were built in 1929. All plants are equipped with recording thermometers and flush valves.

Monthly inspection of producing farms distributing raw milk to consumers and producing farms distributing milk to shippers is made. Distributing plants are inspected monthly also. Milk control practice in Memphis follows the requirements of the standard milk ordinance. These standards disagree with the standards of the Appraisal Form in certain points; for example, the standard milk ordinance requires only monthly inspections of distributing plants, while the Appraisal Form requires weekly inspections. Samples are taken monthly from each dairyman by the operation of a routing plan by which all dairymen coming into Memphis pass seven collecting stations. The milk inspector stations himself at a given station and is able to collect samples easily from all dairymen entering by that route. Eighty-four per cent of the samples of milk before pasteurization showed bacterial counts below 500,000 per c.c.; 67 per cent of these samples had bacterial count below 200,000 per c.c. The pasteurized milk supply showed bacterial counts below 50,000 per c.c. in 88 per cent of the samples. Since 33 per cent of the milk supply of Memphis is consumed raw, it seemed important to study carefully the bacterial counts of this supply. Eighty-four per cent of the samples of retail raw milk had bacterial counts below 50,000 per c.c. The median bacterial count of the milk samples of 125 dairymen producing 80 per cent of the retail raw supply in 1929 was 9,500 per c.c. Judging by its bacterial count, the raw milk supply is produced under clean conditions at the dairy, although the possibility of contamination by pathogenic bacteria is not eliminated even with low counts.

Cattle in the eight counties which constitute the milk shed of Memphis have been tuberculin tested within the past two years.

Bottles of milk are not marked to show date of production or pasteurization. Milk is required to be sold in the original container in restaurants, and opened in the presence of the consumer.

Appraisal Score.

The activities of the Memphis health department in food and milk control in 1929 received a score of 69 per cent. The chief deficiencies in this service were failure to super-

vise the hygiene of foodhandlers, and the limited amount of pasteurized milk available.

Recommendations.

It is recommended:

(1) That the health department prepare a bulletin containing information on personal hygiene and the hygiene of foodhandling, for distribution to foodhandlers.

(2) The great increase in pasteurization which has been brought about in the last two years is most commendable and that continued and persistent effort should be directed to further extension of pasteurization.

(3) That distributing plants be inspected weekly.

(4) That the caps on bottled milk be marked to show date of production or pasteurization.

SANITATION.

The sanitary work of the bureau of sanitation is carried on by two divisions, the division of sanitary inspection and the division of sanitary engineering. Both divisions have directors and there are in addition 13 full-time and two part-time sanitary inspectors. There are nine additional men employed in oiling and ditching for malaria control.

Sanitary Inspection Service.

The number of sanitary inspections of houses far exceeds the number required to give adequate sanitary supervision in an average city of the size of Memphis. During 1929 a special effort was made to secure the installation of sewer connections in the sections of the city which were unsewered. Two sanitary surveys were made, one in June and one in November, 1929, for the purpose of locating the houses which were unconnected with city sewer and water. It was found in the November survey that a great many connections had been made since the June survey. It is a policy of the health department to urge connections of houses not connected with sewer and water rather than to urge the installation of sanitary privies and safe and protected wells.

The malaria control program is under the division of sanitary engineering. The malaria control work carried on in 1929 was done at a cost of $8,700. The malaria control program consists of ditch digging and the cleaning of bayous, the elimination of mosquito breeding places such as ponds, inlets, cisterns, etc., and small mosquito breeding places near houses. During 1929, 294 cases of malaria reported to the health department between June 15th and Oc-

tober 1st were investigated by members of the division of sanitary engineering in order to eliminate any possible mosquito breeding places. In making investigations of these cases, 2,462 homes were visited. Additional information concerning mosquito breeding places was obtained by a questionnaire, 40,000 of which were distributed by the Boy Scouts in May, 1929. This questionnaire gave directions for the prevention of mosquito breeding, and a request that the health department be notified if mosquitoes were troublesome. Between 300 and 350 requests for the assistance of the health department in eradicating mosquito breeding places were received.

Water Supply.

The water supply of Memphis is obtained from artesian wells; it is pumped out with an air pump and filtered but not chlorinated except during water-borne epidemics. The operation of the water supply is under the control of a board of water commissioners appointed by the mayor. The water supply meets the standards of the U. S. Treasury Department. Ninety-seven per cent of the dwellings of Memphis as of July 1, 1929, were connected to receive city water; the city water supply is available to an additional two per cent not yet connected. Laboratory examinations of the municipal supply are made daily by the city chemist.

Sewerage.

The sewage of Memphis is disposed of by dilution in the Mississippi river. Ninety-seven per cent of the dwellings are connected with street sewers and connections are available to an additional two per cent. The number of unsewered dwellings having sanitary cesspools or privies is not known. There is no aggressive campaign to secure the construction of sanitary privies, as an attempt is made to connect all dwellings to the sewers.

Appraisal Score.

The sanitation program and activities of the Memphis health department in 1929 received a score of 93 per cent. The chief deficiency is the small number of dwellings not yet provided with city water and unconnected with the sewerage system. The health department is carrying on an active campaign to reduce the number of these unconnected dwellings. No recommendation for the improvement of this service is necessary since the health department's present program is meeting the indicated defects in sanitation.

LABORATORY.

The laboratory service of the Memphis health department is under the control of the bureau of laboratories. An

agreement has been made with the Memphis General Hospital and the University of Tennessee Medical School, by which the laboratory work is carried on in one of the hospital buildings. In return for the space thus made available the city laboratory does some diagnostic work for the Memphis General Hospital. The bureau of laboratories carries on diagnostic work and makes bacteriological examinations of milk. The examination of water samples is made by the city chemist, whose laboratory is located at the pumping station. The city chemist also makes a small number of chemical examinations of food.

Diagnostic Examinations.

The number of diphtheria specimens examined by the bureau of laboratories appears to be adequate to meet the need for laboratory diagnosis of diphtheria. In spite of the fact that the health department does not require routine examination of nasal cultures in cases of diphtheria, 29 per cent of the examinations made at the laboratory in 1929 were nasal cultures. The laboratory diagnosis of typhoid specimens is also adequate. The number of sputum examinations for the detection of the tubercle bacillus is deficient, only one-third as many specimens having been examined in 1929 as were necessary in view of the high incidence of tuberculosis in the community.

The volume of diagnostic work for the venereal diseases far exceeds the number of examinations required for adequate laboratory diagnosis of syphilis and gonorrhea. The bureau of laboratories issues daily reports of the results of the Wassermann and Kahn tests and the examination of gonorrheal smears. Copies of these reports are sent to the venereal disease clinic and to the health department.

Milk Examinations.

The bureau of laboratories makes bacteriological examinations of the milk supply and butter fat determinations. The number of specimens of raw milk to be pasteurized examined in 1929 was in excess of the number necessary for adequate laboratory supervision of milk of this class. Laboratory examinations of pasteurized and certified milk and of milk to be consumed raw were below the number required by milk control practice in many communities. However, the examinations of pasteurized milk made in Memphis in 1929 met the requirements of the standard milk ordinance which the city has adopted to regulate its activities in milk control.

The amount of certified milk produced constitutes less than one per cent of the total supply. The milk supply, other than certified, consumed raw constitutes 33 per cent

of the total supply, and it would seem to require, therefore, closer bacteriological control than it now receives.

The total volume of work carried on by the bureau of laboratories far exceeds the number of examinations required in a city adequately providing for laboratory service.

The total volume of work carried on by the bureau of laboratories far exceeds the number of examinations required in a city adequately providing for laboratory service. The great excess is probably due to the large number of examinations of venereal disease specimens.

Appraisal Score.

The laboratory service of the Memphis health department in 1929 received a score of 85 per cent. The chief defects of the service were the inadequate laboratory diagnosis of tuberculosis, and insufficient laboratory control of raw milk.

Recommendations.

It is recommended:

(1) That the laboratory examinations of sputum of cases of tuberculosis be increased in order to give adequate assistance in the diagnosis of tuberculosis.

(2) That laboratory control of raw milk be increased.

POPULAR HEALTH INSTRUCTION.

The Memphis health department does not publish popular health bulletins or pamphlets. Selected bulletins and pamphlets of the John Hancock Life Insurance Company, the Metropolitan Life Insurance Company, and the U. S. Children's Bureau are distributed. No record is kept of the number of pamphlets distributed during the year.

The Shelby County Tuberculosis Society distributes literature of the National Tuberculosis Association and a small number of pamphlets of the American Heart Association. A total of 172,000 pieces of literature was distributed by the Tuberculosis Society in 1929. This literature includes bulletins on childhood tuberculosis, and the early diagnosis campaign, the latter distributed to physicians. Leaflets describing the advantages of the tuberculosis camps are also distributed by the society.

The health officer, the director of the medical bureau of service and several of the nurses give lectures. No records were available in the health department on the attendance at these lectures or the subjects covered. The majority of the nurses' talks were given to groups of the parent-teacher association. There is no lecture program operated by the Tuberculosis Society at present.

The health department co-operates annually with the department stores during Child Health Week, assigning nurses to give advice on prenatal and child hygiene, explain the clinic service of the health department, and distribute health literature. Both the health department and the Tuberculosis Society prepare exhibits for the "Tri-State Fair" held annually.

The activities of the health department receive an extensive amount of space in the daily newspapers. There is good co-operation between the health officer and the newspaper reporters, who visit the health department regularly for news. The majority of the space is given to news items built around epidemic outbreaks and special activities of the health department of interest to the public. There are occasional reports of vital statistics. A great deal of space is given to the discussion of the clinics maintained by the Cynthia Milk Fund which is operated by the Press-Scimitar in co-operation with the Memphis health department.

There is a deficiency in editorials and feature stories originating from the health department due to the absence of a co-ordinated program for the instruction of the public through the medium of the press. The activities of the Tuberculosis Society receive newspaper publicity during the Christmas Seal Sale and in the period before the opening of the summer camps; at other times of the year there is little publicity concerning its work.

The Memphis health department prepares a typed annual report for the confidential use of its members; no reports of its work are printed. The Tuberculosis Society issued a printed report in 1929, although its report is usually a typewritten one.

Appraisal Score.

The activities of the Memphis health department in popular health instruction received a score of 39 per cent in 1929. The program is inadequate because of the lack of a co-ordinated plan of publicity, and failure to utilize effectively the reports of health department activities as an educational device.

Recommendations.

It is recommended:

(1) That the health department consider the advisability of publishing literature on the various problems of personal hygiene. This literature might be original or adopted from the publications of state and national health agencies under the imprint of the Memphis health department.

(2) That the lecture program be extended and that records of lectures and attendance be kept.

(3) That the health officer offer guidance to the editors of the newspapers so that their co-operation may be obtained in conducting a regular program of health education, and special campaigns such as one urging immunization against diphtheria.

(4) That an annual report of the work of the health department be published.

PUBLIC HEALTH NURSING.

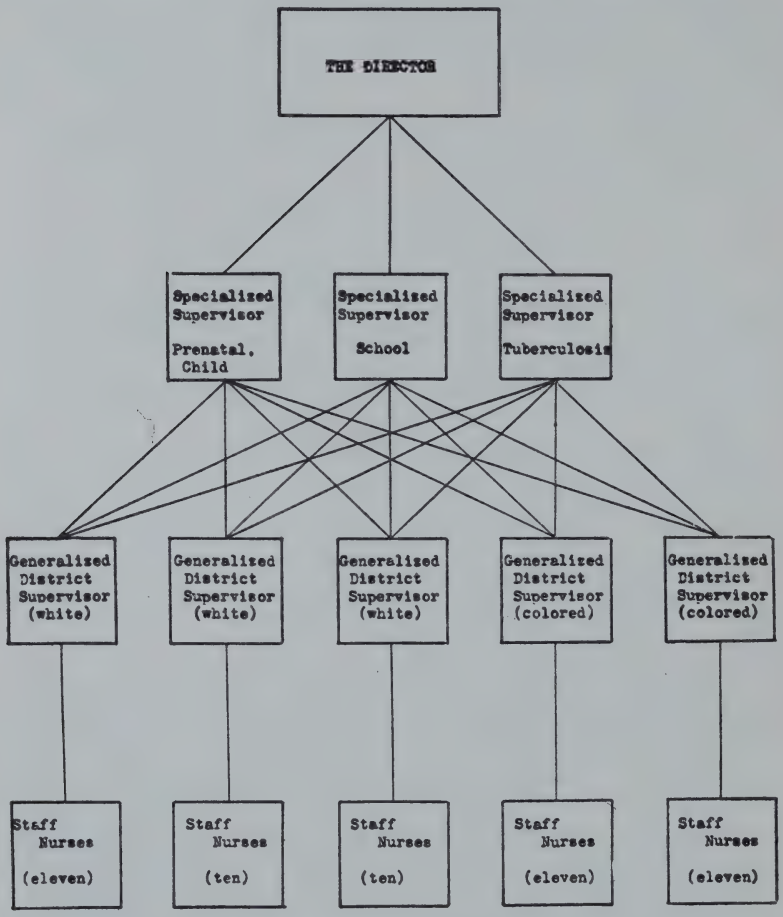
The major public health nursing activities of the city of Memphis are under the direction of the division of public health nursing of the Memphis health department. A small volume of nursing is done by the nurses of the Shelby County Tuberculosis Society and by a group of industrial nurses.

The staff of the division of public health nursing of the Memphis health department consists of a director, a supervisor of school hygiene, a supervisor of maternity and child hygiene, one generalized supervisor (colored), 22 white staff nurses, and 12 colored nurses. The supervisor of maternity and child hygiene is not a supervisor in the strict sense, since she attends prenatal and well-baby clinics and is assigned to the delivery service.

The nursing program is a generalized one with the exception of acute communicable disease control and dental service, to each of which one nurse is assigned for full-time service. The services include a preventive nursing service, delivery service and morbidity service. In 1929, the preventive program, exclusive of assistance in medical examinations and inspections of school children, occupied about 75 per cent of the nurses' time, the morbidity service about 24 per cent, and the delivery service about one per cent. The majority of patients given bedside care were policyholders of the Metropolitan Life Insurance Company, which paid the treasury of the city of Memphis for the service given.

The nursing service was administered at a cost of $53,703.33 in 1929. For morbidity service rendered to policyholders of the Metropolitan Life Insurance Company the treasury of the city of Memphis was reimbursed to the amount of $13,959.50, the cost of 21,066 nursing visits, those to adults at $.75 per visit, and those to infants at $.25 per visit; the city treasury also received fees collected from pay-patients to the amount of $148.00, representing 148 nursing visits at $1.00 per visit, and an additional amount of $1,165 collected from payments for delivery service, nursing assist-

ORGANIZATION CHART—DIVISION OF PUBLIC HEALTH NURSNIG OF THE MEMPHIS HEALTH DEPARTMENT



ance being given at 233 deliveries at a cost of $5.00 per delivery.

Preventive Nursing.

In table XXV is presented a summary of the amount of nursing service given by the Memphis health department in 1929 in relation to the specific needs of the population, based on standard nursing practice.

The magnitude of the tuberculosis problem in Memphis requires that special attention be given to tuberculosis nursing. However, a study of this table shows that tuberculosis nursing was the type of nursing service rendered most inadequately. Standard practice requires an average of 50

TABLE XXV.
SUMMARY OF NURSING SERVICE—MEMPHIS HEALTH DEPARTMENT, 1929, PROBLEMS AND SCORE COMPARED WITH THE STANDARD

Type of Nursing Service	Appraisal Form Standard—Visits	Memphis Performance Total	White	Colored	Total Score, Standard Nursing Service	Score, Memphis Nursing Service	Per Cent
Total, All Preventive Nursing Services					191	147	77
Communicable Disease					14	12	86
Diphtheria	4-case	7.7			2	2	
Scarlet Fever	4-case	3.7			2	2	
Typhoid Fever	4-case	2.4			2	1	
Poliomyelitis	4-case	3.7			2	2	
Cerebrospinal Meningitis	4-case	2.0			2	1	
Measles	2-case	3.4			2	2	
Whooping Cough	2-case	2.1			2	2	
Tuberculosis					23	5	22
Total Visits	50-death	13.9	27.0	9.1	10	3	
Visits per case	8-case	1.4			8	1	
Visits per Postsanatorium Case	10-death	1.1			5	1	
Maternity Hygiene					50	47	94
Delivery Nursing	At least 15% home births (a)	45%	23%	62%	15	15	
Prenatal Cases Registered	25% prenatal cases	63%	35%	100%	25	25	
Prenatal Nursing Visits Per Case	5-case registered	3.7	2.7	4.2	10	7	
Infant Hygiene					50	46	92
Total Visits	Per live birth T.5 W.4 C.6	5.8	3.8	9.1	30	30	
Visits—Case	10-infant registered	7.9	5.3	12.0	20	16	
Preschool Hygiene					40	33	83
Total Visits	30% population 1-5	37.8%	30.4	52.7	25	25	
Visits—Case	4-child, preschool age	2.0	2.1	1.8	15	8	
School Hygiene					10	4	40
Total Visits	40% elementary school pop.	21%	26%	11%	10	4	

(a) Receiving nursing supervision at least three months before delivery.

nursing visits per death from tuberculosis; the nursing service of the Memphis health department made an average of only 14 visits per death. Each diagnosed case of tuberculosis registered with the health department requires an average of eight visits for complete nursing supervision. The Memphis health department nursing service made, on the average only one visit per case of tuberculosis registered. Adequate nursing care of arrested cases of tuberculosis requires ten visits to postsanatorium cases per death from tuberculosis; the nursing service of the Memphis health department made, on the average, only one visit to each postsanatorium case. The inadequacy of tuberculosis nursing is indicated by the score in tuberculosis nursing, which was only 22 per cent.

Nursing service for cases of acute communicable disease was, on the whole, satisfactory. Nursing visits to cases of diphtheria, scarlet fever, poliomyelitis, measles and whooping cough, were adequate in 1929. Nursing visits to cases of typhoid fever and cerebrospinal meningitis were slightly below standard, the score in acute communicable disease nursing being thereby reduced 14 per cent.

An important health problem of the city of Memphis is the adequate health supervision of maternity and infancy. It is, therefore, gratifying to note that the nursing service in the field of maternity and infancy was the most adequate of all types of nursing service given by the nursing service of the Memphis health department in 1929. In the average community, at least 15 to 25 per cent of the expectant mothers who will be delivered at home should receive nursing supervision at least three months before delivery; 45 per cent of the home births occurring in Memphis in 1929 received nursing supervision at least three months before delivery. Nursing supervision in the prenatal period was in great excess of the amount expected among the colored population. A total of 63 per cent of all prenatal cases were registered with the nursinig service of the Memphis health department in 1929; 35 per cent of the white prenatal cases and 100 per cent of the colored prenatal cases were registered. The large volume of prenatal nursing among the colored, which may seem an overstatement of the facts, is supported by the statement of the director of the division of public health nursing that prenatal nursing is a major activity of the colored nurses. Adequate nursing supervision of prenatal cases requires an average of about five prenatal visits per case, and an average of about four visits per case was made by the nursing service of the Memphis health department in 1929. The white prenatal cases received, on the average, fewer visits per case than did the colored; visits to both were slightly below standard. The score of the

nursing service in maternity nursing was 94 per cent, indicating its importance in the Memphis health department's nursing program.

The volume of nursing visits to infants should be determined in reference to the infant mortality rate of a community. On this basis, the white infants of Memphis require fewer nursing visits than do colored infants since their infant mortality rate is lower. If the standard of nursing visits is adjusted to the needs of white and colored infants separately, it is seen that the total number of nursing visits in relation to the live births was adequate for both white and colored infants in Memphis in 1929. The number of visits per white infant registered with the nursing service was about one-half the number required for adequate nursing supervision; the number of nursing visits per colored infant registered exceeded the standard. It seems possible, however, that the standard should be raised to provide necessary supervision of infants among whom the mortality rate exceeds 100. The high score of the infant nursing service of the Memphis health department in 1929 indicates that nursing service for infants approaches closely the standard volume for infant welfare nursing.

Nursing visits should be made by health department nurses to 30 per cent of the population between the ages of one and five. About 40 per cent of the preschool population of Memphis received nursing service in 1929. Visits per preschool child were, however, inadequate. Adequate nursing supervision of the preschool child requires four visits per child registered with the nursing service. Only two visits per case were made among both white and colored preschool children.

The nursing service to school children was the most inadequate of all nursing services to children. Adequate nursing service for school children requires that 40 per cent of the elementary school population should be under nursing supervision by means of home visits, made in regard to defects revealed in medical examinations, or to absentees. About one-half of this percentage of white school children and one-fourth of the colored received home visits in 1929. The score in nursing service for school children was, therefore, only 40 per cent.

Delivery Service.

The delivery service of the Memphis health department is of two types, the first, a service to private physicians for which a $5.00 fee is charged; the second, a service in connection with the outpatient department of the Memphis

General hospital. Two nurses are assigned to the delivery service on part-time.

The growth of the delivery service in the period 1926-1929 is shown in Table XXVI. The number of cases delivered in the outpatient department of the Memphis General hospital has shown 100 per cent increase since 1926. The most marked increase in deliveries has been among those made for private physicians, which, in 1929, had increased to a number five times as large as the number delivered in 1926.

The director of nursing service of the Memphis health department feels that the opportunity for building a pay delivery service in Memphis is a good one, basing her opinion on the increasing demand for this service by private physicians.

It is estimated that each delivery requires between two and one-half and three hours of the nurses' time. It was the former policy of the health department nurses to limit the time spent at a delivery on the outpatient service to four hours. A recent rule of the Memphis General hospital requires that the nurses stay until the delivery is completed. This would seem to be a difficult requirement to enforce with the present inadequate staff of two part-time delivery nurses.

TABLE XXVI.
THE GROWTH OF THE DELIVERY SERVICE
Memphis Health Department, 1926-1929.

Type of Delivery	1926	1927	1928	1929
Total, all white deliveries.....	480	706	915	1,000
Private physician	45	176	271	233
Outpatient Department Memphis General Hospital.....	240	324	392	498
No delivery	195	206	252	269

Care of women in the postpartum period is an important service rendered by the nurses of the Memphis health department. Yet in spite of an apparently large volume of postpartum visits, the number made in 1929 was not adequate to insure satisfactory nursing care. Adequate postpartum care requires an average of eight visits per prenatal case registered. The average number of postpartum visits per prenatal case in Memphis in 1929 was 3.5; among white prenatal cases the average was three visits per case, and among colored cases about four visits per case.

Morbidity Nursing.

The Metropolitan Life Insurance Company has made a contract with the division of public health nursing of the Memphis health department to give bedside nursing care to

its policyholders in Memphis.* The purpose of the Metropolitan Life Insurance Company nursing service as set forth in its nursing manual is a follows:

(a) To give skilled nursing care to policyholders suffering from acute conditions, either medical, surgical or obstetrical. Actual nursing care should be given.
(b) To teach the family how to care for its sick and how to prevent the spread of disease. The nurse should avail herself of this opportunity to teach health habits and home and community hygiene.

The number of industrial policyholders of the Metropolitan Life Insurance Company in Memphis in 1929 was 144,408. The number of those seeking bedside nursing care from the nursing service of the Memphis health department consisted, therefore, largely of policyholders of the Metropolitan Life Insurance Company. Bedside nursing visits were made by the nurses of the Memphis health department in 1929 to 3,441 cases; about 73 per cent of these were policyholders of the Metropolitan Life Insurance Company. An average of five nursing visits were made per case among the Metropolitan Life Insurance Company policyholders visited in 1929. It is to be noted that additional nursing service was given to maternity cases and newborn infants by arrangement with the Metropolitan Life Insurance Company. These visits are included in the total preventive visits made to women in the prenatal and postpartum periods, and to newborn infants, and are, therefore, not included here.

An analysis of the causes of illness among the group of Metropolitan policyholders visited was made by studying the records of the first 25 Metropolitan policyholders receiving nursing service in each month of 1929, a total of 300 cases. The postpartum cases constituted 26 per cent of this total; surgical cases, nine per cent; and medical cases, 65 per cent. The distribution of the medical cases by cause of illness or disability is given in Table XXVII.

TABLE XXVII.
THE CAUSE OF ILLNESS OR DISABILITY IN A GROUP OF 194 METROPOLITAN POLICYHOLDERS RECEIVING NURSING SERVICE FROM THE MEMPHIS HEALTH DEPARTMENT IN 1929.

Cause of Illness or Disability	Cases Requiring Nursing Service for Specified Cause	
	Number	Per Cent
All Medical Causes	194	100.0
Accidents	21	10.8
Tuberculosis	12	6.2

(*) The contract between the Metropolitan Life Insurance Company and the Memphis Health Department ceased to be effective on July 1, 1930.

Colds	12	6.2
Epidemic and infectious diseases	26	13.4
General diseases(a)	26	13.4
Nervous system	7	3.6
Circulatory system—diseases of	11	5.7
Respiratory system	46	23.7
Diarrhea and Enteritis	3	1.5
Digestive system—diseases of	17	8.8
Genito-urinary—diseases of	11	5.7
Diseases of Eyes	1	0.5
Diseases of Ears	1	0.5

(a) Include salpingitis.

A comparison of the causes of illness shows that respiratory diseases, including colds, were responsible for about one-fifth of the illnesses requiring nursing care. The epidemic and infectious diseases, and general diseases were of about equal importance as causes of illness, each constituting about nine per cent of the total cases. Salpingitis was the most frequent cause of illness among the general diseases. A relatively small proportion of visits were made to cases of tuberculosis since it is the policy of the Metropolitan Life Insurance Company to care for these cases "only when other care is not obtainable," and, in that case, to extend care only to cases in the incipient stage.

An Adequate Nursing Program.

While the division of public health nursing has made notable accomplishments in the past in spite of the handicap of a small staff, the imperative need for intensification of nursing in the fields of tuberculosis and child hygiene demands the immediate adoption of a program of expansion. Increased volume of nursing service will be secured by increasing the number of staff nurses. Improvement in the quality of the nursing service will result from adequate supervision by specialized supervisors and by head nurses, who will administer the program of small units of staff nurses.

A comparison of the volume of preventive nursing service given by the nursing division of the Memphis health department in 1929 and the nursing service required for an adequate preventive program in the city of Memphis, exclusive of the area annexed in November, 1929, shows the need for increased nursing staff to provide for 32,000 additional visits annually. The specific types of preventive nursing service in which an increased volume of visits is necessary is shown in Table XXVIII.

The number of nursing visits made to all cases of acute communicable disease in the former city of Memphis in 1929

exceeded by about 1,000 the number of visits indicated by the incidence of acute communicable disease. The number of visits to colored prenatal cases and to colored infants was also in excess of that apparently necessary. In all other preventive nursing services there was a marked deficiency in the volume of nursing visits to both white and colored cases in comparison with standard practice.

The excess over the standard volume of total nursing visits to colored prenatal cases probably does not indicate too intensive visiting of this group, since it has been shown in Table XXV that the average number of visits per case was below the standard. Furthermore, the high maternal mortality rate among colored mothers justifies service in excess of the standard. Similarly, while both the total nursing visits to colored infants and the visits per case exceed the standard, this number is probably not in excess of the need since the mortality rate among colored infants is extremely high.

Provision must be made, then, for an increase in volume of nursing visits in all of the preventive services except that for the acute communicable diseases. The operation of an adequate school health program, including medical examination and inspection, will require the allowance of additional nursing time for assistance in the school, in addition to the necessary home visits.

TABLE XXVIII.

TIME DISTRIBUTION OF PREVENTIVE NURSING SERVICE—MEMPHIS HEALTH DEPARTMENT AND STANDARD PRACTICE COMPARED(a) 1929.

	Standard Nursing Practice					
	Total		White		Colored	
Type of Service	Nurses' Visits	Hours	Nurses' Visits	Hours	Nurses' Visits	Hours
Total, all preventive services ...	94,613	24490.0	53,185	13088.8	41,428	11401.2
Acute communicable disease(b) . ..... (1 visit=19.2')	3,092	989.4	2,061	659.5	1,031	329.9
Tuberculosis . ..... (1 visit=21.1')	16,950	5960.8	4,500	1582.5	12,450	4378.3
Prenatal . ..... (1 visit=19.8')	6,135	2024.6	2,970	980.1	3,165	1044.5
Infant . ..... (1 visit=14.5')	27,600	6670.0	16,650	4023.8	10,950	2646.2
Preschool(c) . ..... (1 visit=12.1')	26,760	5396.6	17,840	3597.7	8,920	1798.9
School . ..... (1 visit=14.7')	14,076	3448.6	9,164	2245.2	4,912	1203.4

Type of Service	Actual Performance, Nursing Division, Memphis Health Department, 1929. Total Nurses' Visits	Total Hours	White Nurses' Visits	White Hours	Colored Nurses' Visits	Colored Hours
Total, all preventive services	62,535	16201.9	30,800	7802.5	31,735	8399.5
Acute communicable disease(b)	4,242	1357.4	2,828	905.0	1,414	452.5
Tuberculosis (1 visit=19.2') (1 visit=21.1')	4,707	1655.3	2,431	854.9	2,276	800.4
Prenatal (1 visit=19.8')	9,266	3057.8	2,207	728.3	7,059	2329.5
Infant (1 visit=14.5')	21,916	5296.4	8,753	2115.3	13,163	3181.1
Preschool(c) (1 visit=12.1')	15,092	3043.6	8,616	1737.6	6,476	1306.0
School (1 visit=14.7')	7,312d	1791.4	5,965	1461.4	1,347	330.0

(a) Data on number of nursing visits only were available from the Memphis Health Department. The number of nursing visits, both actual and ideal, are placed on a time basis by use of the time analysis of the Commonwealth Fund Child Health Demonstration in Athens, Georgia. See Winslow, E. A. Ph.D., Service Norms and Their Variation. Public Health Nurse 22, 68-73. February 1930.

(b) In the calculations of visits to white and colored populations, it is assumed that two-thirds of the local visits were made to white cases, one-third to colored.

(c) The preschool population was estimated to be 10.5 per cent of the total population as of July 1, 1929 (212,383—estimate revised on the basis of the 1930 census).

(d) Includes visits to absentees and visits in behalf of children having physical defects.

TABLE XXIX.

Time Distribution of Staff Nurses In a Minimum Standard Nursing Program Based On the Nursing Requirements of the City of Memphis Before the Annexation of November 1, 1929(a).

Type of Nursing Service	Standard Nursing Practice Total Nurses' Visits	Total Field Hours	Total Nurses	White Nurses' Visits	White Field Hours	White Nurses	Colored Nurses' Visits	Colored Field Hours	Colored Nurses
Total, all nursing service	183,570	65157.8	64.9	110,638	39316.2	39.2	72,932	25841.7	25.7
Preventive:									
Nursing visits(b)	94,613	24490.0	24.4	53,185	13088.8	13.0	41,428	11401.2	11.4
School Program (Exclusive of home nursing visits).		8451.4	8.4		5504.8	5.5		2946.6	2.9
Delivery(c)	265	795.0	.8	117	351.4	.4	148	443.7	.4
Morbidity:(d)									
Post-partum	9,816	3157.5	3.1	4,752	1528.6	1.5	5,064	1628.9	1.6
Other(e)	78,876	28263.9	28.2	52,584	18842.6	18.8	26,292	9421.3	9.4

Type of Nursing Service	Actual Nursing Service, Memphis Health Department, 1929					
	Total		White		Colored	
	Nurses' Visits	Field Hours	Nurses' Visits	Field Hours	Nurses' Visits	Field Hours
Total, all nursing service	88,562	30157.7	33,320	11613.1	38,037	12379.6
Preventive:						
Nursing Visits(b)	62,535	16201.9	30,800	7802.5	31,735	8399.5
School Program (Exclusive of home nursing visits)						
Delivery(c)		4953.0		3000.0		1953.0
Morbidity:(d)						
Post-partum	8,822	2837.7	2,520	810.6	6,302	2027.1
Other(e)	17,205f	6165.1				

(a) The population is estimated to be 212,383.
(b) See Table XXVIII.
(c) A delivery is estimated by the director of nursing to require three nursing hours.
(d) Each postpartum visit is estimated to require 19.3 minutes; each bedside visit to other sick cases, 21.5 minutes.
(e) It may be assumed that 53,836 visits, the equivalent of 19,291 hours, will be made to Metropolitan Life Insurance Company policyholders. This service would require 19 nurses.
For the method of estimating the number requiring bedside care, see "Community Health Organization Plan"—Ira V. Hiscock, 1927.
(f) Each case is assumed to have received five visits, 2,512 patients were policyholders of the Metropolitan Life Insurance Company; 929, other patients.

The large number of births hospitalized in Memphis reduces proportionately the responsibility of the health department for delivery nursing. The amount of time devoted to delivery nursing by health department nurses in 1929 exceeds that usually considered adequate in a standard nursing program. The actual excess, shown in Table XXIX, is seen to be about 4,000 hours. While local conditions may justify the provision of nursing care at delivery in excess of the standard amount, further expansion of the delivery service should be delayed until an adequate nursing staff has been provided for the preventive and bedside nursing services.

The morbidity nursing service given by the nursing division in 1929 was inadequate with the exception of postpartum care to colored cases, which exceeded the standard. A comparison of the actual amount of time devoted to the morbidity service in Memphis with the standard amount indicated is given in Table XXIX.

The volume of morbidity nursing visits which must be made by the nursing staff of the Memphis health department may be reduced in 1930 with the assumption of responsibility for morbidity service to its policyholders by the

recently established Metropolitan Life Insurance Company nursing service. However, if allowance is made for this reduction the volume of morbidity nursing provided by the nursing division of the Memphis health department must be increased over that given in 1929 if those dependent on this service are to be adequately cared for.

It is necessary, then, to determine the number of staff nurses required to provide the indicated increases in the preventive morbidity nursing services. The time analysis of the nursing service of the Commonwealth Fund Child Health Demonstration in Athens, Georgia, shows that about one-half of the nurse's time is available for actual field service, the remaining half being occupied with educational activities, office work, and the necessary allowance for travel, vacation and sick leave. On this basis, each nurse is capable of giving approximately 1,000 hours of field service. The preventive nursing service will, therefore, require a staff of at least 32 nurses; the delivery service, at least one nurse; the morbidity service, excluding service to Metropolitan Life Insurance Company policyholders, at least 11 nurses. A total of 44 staff nurses will be required, therefore, to give the minimum nursing service demanded by a balanced program in the city of Memphis exclusive of the area annexed in November, 1929. If it may be assumed that the nursing needs of the recently annexed area are similar to those of the former city, then at least eight additional staff nurses must be provided to extend nursing service to this territory. This minimum of 52 staff nurses should consist of 31 white and 21 colored nurses.

Generalized supervisors must be provided to assist the staff nurses in the adaptation and execution to assist the directions of the specialized supervisors. The National Organization for Public Health Nursing recommends* a minimum of one generalized supervisor to eight to ten staff nurses. On this basis, at least five generalized supervisors must be provided to supervise a nursing staff of 52. These generalized supervisors might be selected from the present staff nurses in the highest salary group.

In addition to the two specialized supervisors on the present staff of the division of nursing a specialized supervisor of tuberculosis nursing should be added. The staff of specialized supervisors should be further increased when the necessary number of staff nurses and generalized supervisors has been provided.

The development of an adequate nursing program for

(*) Tucker, Katherine, Chairman, Shifts in Emphasis. Report of the Education Committee of the National Organization for Public Health Nursing, 370 Seventh Ave., New York, N. Y. 1928.

the city of Memphis requires that the present staff be increased by the appointment of a specialized supervisor of tuberculosis nursing, five generalized supervisors (three white, two colored), and 52 staff nurses (31 white, 21 colored).

When the present nursing staff has been increased to include the necessary specialized supervisors and at least three generalized supervisors, the advantages of pupil nurse affiliation to the nursing division should be considered. The Education Committee of the National Organization for Public Health Nursing† recommends "that no public health nursing agency should enter into pupil nurse affiliation unless it is prepared to accept an educational responsibility for the student." In terms of staff, this means that the number of generalized supervisors must be increased further if pupil nurses are to be supervised in addition to the regular staff nurses. A supervisor of staff education will be necessary to continue the professional training of the staff nurses and to direct the work of the student nurses. The plan of pupil nurse affiliation should provide for a minimum period of affiliation of three months if the student nurses and the health department are to derive permanent advantages from the arrangement.

ORGANIZED CARE OF THE SICK.

Organized care of the sick in Memphis and Shelby county is provided by 15 hospitals having an estimated capacity of 2,000 beds. In addition to these local hospitals the U. S. Marine Hospital and the U. S. Veterans' hospital are located in Shelby county.

The number of beds and days' care given by hospitals answering a questionnaire sent out by the superintendent of health of Memphis in connection with the survey, are given in Table XXX.

Of the hospitals listed in this table, the Memphis General hospital, Oakville Memorial Sanatorium (Memphis and Shelby county Tuberculosis hospital), the Shelby County hospital and the Shelby County Emergency hospital are tax supported. The total current expenses of these institutions in 1929 (exclusive of the Shelby County Emergency hospital, which did not submit data on expenditures) amounted to $659,170.61, distributed as follows:

(†) Tucker, Katherine, Chairman, Shifts in Emphasis. Report of the Education Committee of the National Organization for Public Health Nursing, 370 Seventh Ave., New York, N. Y. 1928.

Memphis General Hospital(1)	$375,282.15
Oakville Memorial Sanatorium	95,000.00
Shelby County Hospital	188,888.46
Total	$659,170.61

(1) Expenditures of the Isolation hospital are included.

The Shelby County hospital reported no income from sources other than taxes. The Memphis General hospital reported an income from patients and other sources amounting to $31,439.65 in 1929. The Oakville Memorial Sanatorium receives some income from patients able to pay for care; the amount of this income was not reported, however. If allowance is made for such reimbursement the expenditure from official funds for hospital care in Memphis and Shelby county amounts to approximately $2.00 per capita.

TABLE XXX.

BED CAPACITY AND DAYS OF CARE IN MEMPHIS AND SHELBY COUNTY HOSPITALS(a) 1929.

Name of Institution	Number of beds	Days of care
Total	1,888	624,495
Crippled Adult hospital	35	14,995
Crippled Children's hospital	36	11,311
Henry G. Hill Clinic(b)	10	2,190
Lynnhurst Sanatorium	20	Not reported
Memphis Eye, Ear, Nose & Throat hosp.	65	5,458
Memphis General hospital(c)	417	108,544
Methodist hospital	185	50,155
Oakville Memorial Sanatorium	240	78,467
Royal Circle hospital	25	54,000
U. S. Marine hospital(d)	65	9,565
Shelby County hospital	580	215,350
Shelby County Emergency hospital	210	74,460

(a) The Baptist Memorial hospital, St. Joheph's hospital, Gartly-Ramsay hospital, Inc., and the Tennessee Home for Incurables, did not answer the questionnaire.
(b) An orthopedic clinic used by the two members of the staff.
(c) Figures do not include bassinets: Methodist hospital 25, and Memphis General hospital 72.
(d) Days of care of Memphis residents only.

The Royal Circle hospital is supported by funds received from the Supreme Royal Circle of Friends, amounting to $6,500 in 1929. The Crippled Children's hospital is supported by voluntary contributions which amounted to $24,000 in 1929. The Memphis Eye, Ear, Nose and Throat hospital and the Methodist hospital are maintained by income received from patients, the former reporting an income of

$85,434.16, and the latter $275,968.46, in 1929. The Lynnhurst Sanatorium is also supported by income from patients, but no figures on income were reported by this institution.

Most of the hospitals answering the questionnaire report that hospital care was given to non-residents. The figures on the amount of non-resident hospital care reported are summarized in Table XXXI.

TABLE XXXI.

HOSPITAL CARE OF NON-RESIDENTS IN CERTAIN MEMPHIS AND SHELBY COUNTY HOSPITALS, 1929.

Name of Institution	Total Days' Care	Days' Care to Non-residents of Memphis	Days' Care to Patients in Shelby County (a)
Crippled Adult hospital....	14,995	14,588	407
Henry G. Hill Clinic.....	2,190	1,400	150
Lyonhurst Sanatorium....	Not reported	About 2-3	About 1-3
Memphis Eye, Ear, Nose & Throat hospital	5,458	About 10%	About 15%
Royal Circle hospital.....	54,000	36,000	7,000
Shelby County Emergency hospital	74,460	12,310	9,490

(a) Exclusive of Memphis.

The Crippled Children's hospital did not report days' care by residence, but stated that of the 142 children cared for in 1929 only 45 were from Tennessee, the remainder being admitted from Mississippi (68), Arkansas (23), Alabama (4), and Kentucky and Illinois one each.

The Memphis General hospital is theoretically for the care of Memphis residents only, but some residents of Shelby county are admitted. This is a courtesy extended to Shelby county residents, in return for which residents of Memphis are admitted to the Shelby County Emergency hospital and the Shelby County hospital. The Oakville Memorial Sanatorium, being supported by the city of Memphis and Shelby county, admits residents of both areas. All of these hospitals theoretically prohibit the admission of residents of Tennessee, exclusive of Shelby county, and of other states. However, many nonresidents gain entrance to these institutions by establishing temporary residence in Memphis or Shelby county. Thus, both official and nonofficial agencies bear

an added burden of responsibility for institutional care of nonresidents.

The Memphis General hospital is the only hospital in Memphis which admits negroes.

Outpatient departments are maintained by the Crippled Adult hospital, the Henry G. Hill Clinic, the Memphis Eye, Ear, Nose and Throat hospital, the Royal Circle hospital and the Memphis General hospital. The outpatient department of the Memphis General hospital is operated jointly with the University of Tennessee Medical School, the Memphis health department and the Oakville Memorial Sanatorium. It includes tuberculosis, venereal disease, child hygiene and maternity clinics, to which both colored and white patients are admitted. These clinics, except the tuberculosis clinic, are used by the University of Tennessee for teaching purposes.

Cases of communicable disease in Memphis are hospitalized at the Isolation hospital, which is maintained as part of the Memphis General hospital. Theoretically, tuberculosis patients are not admitted to the Isolation hospital, but because of the inadequacy of beds at the Oakville Memorial Sanatorium an average of 10 to 15 cases of tuberculosis are usually in the Isolation hospital.

The Memphis General hospital states that its facilities for medical and surgical cases are inadequate.

The Oakville Memorial Sanatorium is supported by the city of Memphis and Shelby county for the care of cases of tuberculosis. Cheerfield Farm, a preventorium, first maintained by the Shelby County Tuberculosis Society and later transferred to official support, is operated by the sanatorium. The number of beds in the Oakville Memorial Sanatorium is 240, which is inadequate to meet the demand for hospitalization of the tuberculous because of the high tuberculosis death rate prevailing in both city and county. Provision has been made for an addition to this sanatorium but funds for maintenance have not yet been appropriated.

Recommendations.

It is recommended:

(1) That facilities for the medical and surgical patients in the Memphis General hospital be increased.

(2) That the city of Memphis make legal provision which will enable Shelby county patients to enter all departments of the Memphis General hospital.

(3) That an arrangement be made between the county and city health departments whereby Shelby county will pay for the care of county patients admitted to the Isolation hospital.

(4) That the practice of using the Isolation hospital beds for the care of bedridden tuberculous patients be discontinued as soon as possible. Means should be provided for the care of these cases of tuberculosis so that these beds may be available for cases of communicable disease.

(5) That thought be given to the decentralization of certain clinical facilities at the Memphis General hospital, the administration of these services to be on the same basis as those now at the Memphis General hospital.

(6) That the provision for hospitalization of cases of tuberculosis be increased by prompt execution of the building program providing for an addition at the Oakville Tuberculosis Sanatorium.

ORGANIZATION AND PERSONNEL.

In many cities of this country, nonofficial health agencies share with the municipal health department the responsibility for the public health activities of the community. The direction of the public health nursing service, in particular, is frequently assumed by nonofficial health agencies. In Memphis the major public health activities are centralized within the Memphis health department. The public health nursing service is administered by its division of public health nursing, with the exception of the bedside and prenatal nursing service recently inaugurated by the Metropolitan Life Insurance Company for its policyholders, and the limited nursing activities of the Shelby County Tuberculosis Society. The latter society also gives assistance through medical service, maintenance of summer camps and health education, in the control of tuberculosis. With these exceptions, the public health program of the city of Memphis is under official direction.

While this type of organization brings a desirable unification of the public health program, it also places on the health department the major responsibility for the provision of the public health personnel of the community.

Organization and Personnel, 1929.

In 1929 the activities of the Memphis department of health were administered through the bureaus of administration, medical services, laboratories and sanitation. The divisions of vital statistics and records were subordinate to the bureau of administration. The work of the bureau of medical services was administered through the divisions of communicable diseases, dental hygiene, child hygiene and public health nursing. The divisions of the bureau of sanitation consisted of the division of sanitary inspection, food and drugs, milk control and sanitary engineering. The work

of the bureau of laboratories was carried on through the division of serology, bacteriology, and milk and water analysis.

The staff of the Memphis health department in 1929 consisted of 87 full-time and 14 part-time workers. The distribution of the staff by divisions in shown in Table XXXII.

TABLE XXXII.
THE STAFF OF THE MEMPHIS HEALTH DEPARTMENT, 1929.

Bureau or Division of the Health Department	Number of Staff	
	Full-time	Part-time
Total	87	13
Administration	2	..
Vital statistics	2	..
Communicable disease	3	..
Child hygiene	1	2
Dental hygiene	2	..
Public health nursing	38	..
Sanitary inspection	17	..
Food and drugs	4	..
Milk control	7	..
Sanitary engineering	2	11
Laboratories	9	..

The medical services of the clinics of the divisions of communicable disease and child hygiene were provided by other official and nonofficial agencies. The medical staff of the tuberculosis clinic consisted of a physician of the staff of the Oakville Tuberculosis Sanatorium, the physician employed by the Shelby County Tuberculosis Society, and the director of child hygiene of the Shelby county health department. The staff of the venereal disease clinic was provided by the University of Tennessee Medical School, which also provided the staff for the prenatal clinic. The nursing staff for the venereal disease clinic was provided by the Memphis General hospital.

The major cost of maintenance of these clinics is carried by the Memphis General hospital, since they constitute its outpatient department.

Recommended Organization and Personnel, 1930.

The major change in organization recommended for the Memphis health department is the administration of all activities relating to tuberculosis control through a division of tuberculosis. The director of this division should assume direction of the complete program of tuberculosis control, including particularly the provision of clinic services. The tuberculosis nursing service should be carried on under

his direction through the director of the division of public health nursing and the supervisor of tuberculosis nursing.

It is desirable for the health department to maintain supervision over the venereal disease clinic. The responsibility for the co-ordination of the activities of this clinic with the venereal disease control program of the health department should be placed on the director of the division of communicable disease.

TABLE XXXIII.
RECOMMENDED STAFF OF THE MEMPHIS HEALTH DEPARTMENT, 1930.

Bureau or Division of the Health Department	Number of Staff Full-time	Part-time
Total health department staff	119	21
Administration		
Health officer	1	..
Chief clerk	1	..
Stenographer	1	..
Public health education		
Assistant	1	..
Vital statistics		
Chief	1	..
Clerk	1	..
Communicable disease (except tuberculosis and venereal disease)		
Chief	..	1
Inspector	1	..
Clerk	1	..
Tuberculosis		
Director	1	..
Social worker	1	..
Clerk	..	1
Venereal disease		
Director	..	1
Social worker	1	..
Clerk	..	1
Prenatal, infant and preschool hygiene		
Chief	..	1
Clerk	1	..
School hygiene		
Chief	..	1
Medical inspectors	..	3
Dentists	2	..
Public health nursing		
Director	1	..
Supervisors—generalized	5	..

TABLE XXXIII.—(Continued)

Bureau or Division of the Health Department	Number of Staff Full-time	Part-time
Supervisors—district	3	..
Staff nurses	52	..
Clerks	2	..
Sanitary inspection		
Chief	1	..
District inspectors	14	..
Clerks	2	..
Food and drugs		
Chief	1	..
Inspectors	3	..
Milk control		
Chief	1	..
Veterinarian	1	..
Inspectors	5	..
Sanitary engineering		
Chief	..	1
Inspectors	1	2
Foreman	1	3
Helpers	1	6
Laboratories		
Chief	1	..
Assistant	1	..
Technician	8	..
Clerk	1	..

The reorganization recommended for the division of public health nursing is discussed in the chapter on public health nursing.

The personnel recommended for the Memphis health department to provide the adequate developmnt of a community health program is summarized in Table XXXIII.

In making these recommendations for personnel it is assumed that in 1930 the same amount of medical service will be provided by the University of Tennessee Medical School, the Oakville Tuberculosis Sanatorium, and the Shelby County Tuberculosis Society, as was provided in 1929.

The necessary increase in clinical facilities for the tuberculous will require four sessions of the tuberculosis clinic weekly. The director of the division of child hygiene will act as medical director of the well-baby clinic.

In order to provide medical and dental service for colored school children, one each of the recommended staff of medical inspectors and dentists should be colored.

The Cost of the Recommended Staff.

The support of the recommended staff of the Memphis health department will require the appropriation of approximately $255,000 annually. This amount is exclusive of the cost of maintenance of the outpatient department of the Memphis General hospital and of the salaries of the members of the staff of the University of Tennessee Medical School, who provide medical service for several of the clinics. Approximately $205,000 of this amount will be expended in salaries, and $50,000 in maintenance. The distribution of the expenditures of the health department for salaries of the recommended staff is given in Table XXXIV.

TABLE XXXIV.

EXPENDITURES FOR SALARIES OF THE RECOMMENDED STAFF, MEMPHIS HEALTH DEPARTMENT, 1930

Bureau or Division	Total Salaries
Total health department	$205,091
Administration	8,000
Public health education	2,200
Vital statistics	3,960
Communicable disease	10,440
Tuberculosis	6,420
Child hygiene	7,800
Dental hygiene	8,460
Public health nursing	86,400
Sanitary inspection(a)	27,960
Sanitary engineering (Malaria control) (b)	12,551
Food and drugs	6,120
Milk control	12,600
Laboratories	12,180

(a) Includes a pension of $600 per annum to a retired inspector.
(b) Based on actual salaries for January-June, 1930, and forecasted salaries for July-December, 1930.

The cost of maintenance is estimated on the basis of actual cost of maintenance of the health department in 1929, which amounted to $38,622.09, with an estimated additional maintenance cost of approximately $11,000 for 1930.

APPENDIX TABLE I.

THE POPULATION OF MEMPHIS (FORMER CITY)a 1920-1929.

Figures Estimated as of July 1st.

Year	Total Population		White	Colored
	Estimates based on 1910 and 1920 Census	Estimates based on 1920 and 1930 Census(b)	Estimates based on 1910 and 1920 Census(c)	
1920	163,453	164,543	102,073	61,380
1921	165,656	168,926	103,993	61,663
1922	167,862	173,309	105,913	61,949
1923	170,067	177,692	107,833	62,235
1924	172,274	182,075	109,753	62,521
1925	174,480	186,458	111,673	62,807
1926	176,686	190,841	113,593	63,093
1927	178,892	195,224	115,513	63,379
1928	190,200	207,966	126,233	63,967
1929d	192,515	212,383	128,258	64,257

(a) On November 1, 1929, an area designated as wards 39-50 was annexed to Memphis. The city of Memphis prior to this annexation is therefore referred to here as the "former city." The preliminary enumeration of the population of the annexed area, by the census as of April 1, 1930, was 36,354.

(b) Preliminary release of 1930 census figure by the supervisor of the census, 9th district of Tennessee.

(c) Preliminary figures by 1930 census not available.

(d) The revised estimate of the population of Memphis as of July 1, 1929, was computed as follows:

Population, Wards 1-35, January 1, 1920.....162,351
Population, Wards 1-36(1) April 1, 1930.....207,277
Annual increase 4,383
Population, Wards 1-36, July 1, 1929.....203,990
Population, Wards 37, 38(2), July 1, 1929..... 8,393
Total, Wards 1-38, July 1, 1929.....212,383

(1) Ward 36 resulted from the division of Ward 21 in 1928. It does not represent new territory.

(2) The annexation of Highland Heights, designated as Wards 37 and 38, occurred in 1928. The population of these wards on April 1, 1930, was 8,418. The resident birth rate of Memphis in 1928 was 19.7; in 1929, 19.4; the resident death rate in 1928 was 15.4; in 1929, 15.3. Assuming a natural increase of 4 per 1,000, the population of this annexed area was 8,359 on July 1, 1928, and 8,393 on July 1, 1929. These figures are not corrected for changes in the number of the population by immigration or emigration.

TABLE II.

TYPHOID DEATH RATES—MEMPHIS.

Year	Total	White	Colored	Year	Total	White	Colored
1883	38.5	39.8	36.2	1907	27.7	26.2	29.6
1884	61.0	47.3	86.0	1908	26.3	23.0	30.1
1885	46.5	37.3	63.3	1909	31.4	28.7	34.7
1886	63.1	72.8	51.4	1910	27.5	19.1	40.0

1887a				1911	51.3	35.2	81.8
1888	81.1	76.2	87.0	1912	40.6	25.9	68.4
1889a				1913	28.8	25.1	35.2
1890	58.3	48.5	70.4	1914	36.9	37.6	36.0
1891	73.2	71.0	75.8	1915	23.8	24.7	22.7
1892	34.1	32.5	36.1	1916	45.0	47.1	42.7
1893	37.9	30.9	46.9	1917	20.0	28.2	10.7
1894	73.3	74.7	71.7	1918	14.4	16.5	12.0
1895	57.2	49.8	64.5	1919	62.8	48.3	88.0
1896	67.7	76.9	58.0	1920	9.5	4.1	19.0
1897	47.0	54.1	39.6	1921	13.4	8.1	22.7
1898	37.3	38.2	36.3	1922	8.3	8.5	9.7
1899a				1923	14.1	7.4	25.7
1900	34.3	35.1	33.3	1924	34.8	9.1	80.0
1901a				1925	28.7	17.0	49.4
1902	28.3	31.8	24.1	1926	19.2	15.0	26.9
1903	34.6	39.4	28.8	1927	14.5	9.5	23.7
1904	39.3	36.8	42.2	1928	11.6	7.9	18.8
1905a				1929	6.2	5.5	7.8
1906	31.3	27.2	36.2				

(a) Data not available.

TABLE III.
PULMONARY TUBERCULOSIS DEATH RATES—MEMPHIS

Year	Total	White	Colored	Year	Total	White	Colored
1883	330.7	179.1	606.3	1907	153.5	94.0	223.9
1884	357.9	238.8	574.7	1908	166.3	103.4	241.1
1885	361.2	253.7	556.6	1909	155.0	108.5	213.3
1886	425.2	304.6	569.2	1910	248.7	141.2	409.5
1887a				1911	183.1	90.5	360.0
1888	374.8	284.8	482.2	1912	193.9	114.8	343.9
1889a				1913	180.0	92.1	331.2
1890	336.7	230.3	466.7	1914	243.8	110.6	394.7
1891	351.2	236.7	491.0	1915	225.6	123.5	341.3
1892	346.3	183.4	545.1	1916	221.3	81.2	380.0
1893	317.2	188.3	480.5	1917	233.1	141.2	337.3
1894	336.3	220.6	451.6	1918	231.3	134.1	341.3
1895	373.9	291.8	455.2	1919	200.3	86.1	399.8
1896	352.9	279.7	427.5	1920	178.6	91.1	324.2
1897	333.9	213.4	458.7	1921	146.0	62.5	287.1
1898	306.3	222.9	392.7	1922	135.2	60.4	263.3
1899a				1923	136.4	68.6	254.0
1900	235.2	164.9	318.8	1924	141.6	61.0	283.2
1901a				1925	132.4	51.9	275.5
1902	229.2	127.3	353.7	1926	116.0	58.1	220.3
1903	152.3	80.3	239.0	1927	131.4	62.3	257.1

1904	180.0	113.2	259.4	1928	149.3	60.2	326.0
1905a				1929	125.7	56.9	262.8
1906	166.0	124.7	214.5				

(a) Data not available.

TABLE IV.

BRONCHO PNEUMONIA DEATH RATES—MEMPHIS

Year	Total	White	Colored	Year	Total	White	Colored
1883b				1907	28.4	27.4	29.6
1884b				1908	20.6	23.0	17.8
1885b				1909	16.6	19.1	13.3
1886b				1910	36.6	38.2	34.3
1887a				1911	38.8	27.6	60.0
1888	1.8	3.3		1912	65.5	50.0	94.7
1889a				1913	58.2	40.0	89.6
1890b				1914	54.4	29.4	82.7
1891b				1915	61.3	45.9	78.7
1892b				1916	24.4	21.2	28.0
1893	27.6	24.7	31.3	1917	66.3	57.6	76.0
1894	3.6	7.1		1918	155.0	172.9	134.7
1895	5.4	7.1	3.6	1919	56.1	52.5	62.4
1896	8.9	7.0	10.9	1920	60.6	46.0	84.7
1897	4.9	9.6		1921	36.2	36.5	35.7
1898a				1922	94.1	74.6	127.6
1899a				1923	142.6	118.7	184.9
1900a				1924	99.2	74.7	142.4
1901a				1925	95.1	56.4	164.0
1902	8.3	9.1	7.4	1926	63.4	49.3	88.7
1903	29.2	22.5	37.3	1927	58.7	45.0	83.6
1904	50.0	40.8	60.9	1928	55.2	46.0	73.4
1905a				1929	64.9	50.7	93.3
1906	16.7	16.0	17.4				

(a) Data not available.
(b) Not reported as "Broncho Pneumonia."

TABLE V.

LOBAR PNEUMONIA DEATH RATES—MEMPHIS

Year	Total	White	Colored	Year	Total	White	Colored
1883	173.4	116.9	276.0	1907	117.4	75.0	167.6
1884	216.7	109.5	411.8	1908	114.4	75.9	160.3
1885	199.0	124.4	334.8	1909	81.1	44.7	126.7
1886	160.4	102.6	229.2	1910	165.5	103.1	259.0
1887a				1911	142.5	86.7	249.1
1888	135.1	9.9	284.6	1912	92.7	46.3	180.7
1889a				1913	92.4	57.7	152.0

1890	130.0	97.0	170.4	1914	108.1	75.3	145.3
1891	187.0	133.1	252.7	1915	93.1	67.1	122.7
1892	139.8	76.9	216.6	1916	86.3	68.2	106.7
1893	151.7	95.7	222.7	1917	152.5	111.8	198.7
1894	123.4	78.3	168.5	1918	360.0	394.1	321.3
1895	223.6	160.1	286.7	1919	164.2	134.4	253.2
1896	162.2	122.4	202.9	1920	161.5	100.9	262.2
1897	149.1	114.6	184.8	1921	68.2	43.3	110.2
1898	307.9	293.0	323.4	1922	114.4	77.4	177.7
1899a				1923	145.8	103.9	218.6
1900	348.6	256.1	458.3	1924	143.9	76.5	262.4
1901a				1925	102.6	51.9	192.7
1902	100.8	69.7	138.9	1926	107.5	72.2	171.1
1903	126.2	105.6	150.8	1927	99.5	63.2	165.6
1904	172.9	128.9	225.0	1928	107.8	60.2	201.6
1905a				1929	99.7	73.3	152.4
1906	129.3	88.9	176.8				

(a) Data not available.

TABLE VI.
MALARIA DEATH RATES—MEMPHIS

Year	Total	White	Colored	Year	Total	White	Colored
1883	94.7	74.6	131.2	1907	80.6	36.7	133.8
1884	160.5	84.6	298.6	1908	78.1	42.5	120.5
1885	133.2	87.1	217.2	1909	69.3	43.6	101.3
1886	122.5	96.0	154.2	1910	66.4	36.9	110.5
1887a				1911	74.4	27.6	163.6
1888	167.6	89.4	260.9	1912	65.5	29.6	133.3
1889a				1913	52.9	23.3	104.0
1890	190.0	154.5	233.3	1914	46.3	22.4	73.3
1891	86.2	74.0	101.1	1915	60.0	30.6	93.3
1892	74.8	65.1	86.6	1916	37.5	25.9	50.7
1893	106.2	61.7	160.2	1917	28.1	21.2	36.0
1894	87.7	46.3	129.0	1918	27.5	9.4	48.0
1895	82.3	32.0	132.6	1919	31.4	12.6	64.2
1896	85.6	31.5	141.3	1920	22.0	6.9	47.2
1897	92.4	47.8	138.6	1921	47.1	26.0	82.7
1898	129.7	82.8	178.2	1922	20.3	15.1	29.1
1899a				1923	12.9	10.2	17.7
1900	205.7	133.3	291.7	1924	9.9	7.3	14.4
1901a				1925	9.2	9.8	8.0
1902	126.7	75.8	188.9	1926	11.3	11.4	11.1
1903	113.8	60.6	178.0	1927	9.5	7.8	12.6
1904	114.3	84.2	150.0	1928	11.6	10.3	14.1
1905a				1929	9.4	7.0	14.0
1906	98.0	55.6	147.8				

(a) Data not available.

In accordance with recommendations made by Dr. W. F. Walker in his report on the Survey of Health Problems and Facilities in Memphis and Shelby County for the year 1929 the following recommendations have been or are being carried out by the Memphis Health Department:

Vital Statistics—The addition of one statistical clerk on half time.

Installation of alphabetical card file system for current records has been made and, as time will admit, similar files are being prepared for previous years.

Communicable Diseases—Marked increase in immunization of white and colored pre-school children and colored school children against diphtheria.

Taking of both nose and throat cultures before releasing cases of diphtheria.

Addition of one physician who gives most of his time to immunization work. Immunization against typhoid fever has been promoted as recommended.

Tuberculosis—Nursing service has been intensified both by addition of nurses, and because the Health Department has been relieved of Metropolitan bed-side nursing service. This is equivalent to the addition of about eight nurses to our general staff.

The nursing records have been modified as recommended.

Maternity Hygiene—An effort is being made to get prenatal cases to the clinics earlier as recommended.

Nursing service in this field has also been increased.

Infant Hygiene—More nursing time is devoted to prenatal care.

Preschool Hygiene—A greater number of preschool children are receiving physical examinations before entering school.

The Cynthia Milk Fund clinics have been developed into preschool clinics.

School Hygiene—Additional medical service has enabled us to extend medical inspection to a greater number of school children.

Nursing—In addition to increased personnel an affiliation has been formed with four training schools whereby senior pupil nurses receive training in the Health Department.

Inter-Chamber Health Conservation Contest—Memphis received honorable mention in the Inter-Chamber Health Conservation Contest for 1930. This is the first time the city has entered this contest, and much credit was given because of the survey which had just been completed by Dr. W. F. Walker.

L. M. GRAVES, M. D.,
Supt. of City Health Dept.

POPULATION SHELBY COUNTY, 53,156

1 9 3 1

The recommendations made after an analysis of survey by Committee of A. P. H. A., shall be considered as they appear at conclusion of report of each activity.

Vital Statistics—Recommendation (1) and (2) are being carried out. (3) This has not been concurred in.

Communicable Disease Control—All recommendations under this heading have been carried out.

Venereal Disease Control—The recommendations under this heading are being put into effect.

Tuberculosis Control—The tuberculosis program has been reorganized and this work is carried on according to State Department plan. Clinics are being held in strategic points in the county. Nursing service has been increased in volume and frequence of visits per case.

We have been unable to hospitalize a larger number of patients due to lack of room in Oakville Tuberculosis Sanatorium.

The recommendations under Prenatal Hygiene are being concurred in at this time.

The recommendations under Infant Hygiene are being carried out.

The recommendations under Pre-School Hygiene are being carried out wholly.

School Hygiene—A program to examine colored children this summer and fall has been made. More defects than ever before have been corrected.

Safe water supplies, sanitary, fly-proof pit privies and adequate facilities are being supplied at colored schools.

Sanitation, Food, Milk Control and Sewerage—The supervision of food handling establishments in villages of the county has not been done up to this time but a plan and program is being formulated. The "one cow" dairies have been checked up and compelled to comply with State regulations.

The Memphis Health Department has placed at the disposal of Shelby County Health Department all data relating to the sanitary condition of dairies and the bacterial content of milk produced in Shelby County.

A diligent campaign to secure protected wells and sanitary privies for all rural homes is being conducted along with the screening campaign.

Laboratory Service—This has been greatly increased.

Popular Health Instruction—A systematic use of education literature on prenatal care, child hygiene and control of communicable diseases, is being made by the County Health Department.

A record of newspaper publicity and lectures is being kept.

WALLACE P. MOORE, M. D.,
Supt. Shelby County Health Dept.

INTRODUCTION.

The Shelby county health department was organized as a full-time unit in 1926, prior to which it had existed as a part-time unit with a health officer and two nurses. One physician and one nurse had been doing health work in Shelby county since 1914. In spite of its recent establishment as a full-time unit, the department has shown satisfactory development and has given service of a quality which is commendable in view of the difficulties inherent in rural health service.

With the exception of infant hygiene and venereal disease control, in which its services were almost negligible, the program of the Shelby county health department in 1929 included work in all the major public health activities. The adequacy of these services was in many cases unsatisfactory, however. The most completely developed of its services were communicable disease control and sanitation. Tuberculosis control was approximately 35 per cent effective. Preschool and school hygiene activities provided approximately 58 per cent of the services required for standard health protection of these groups. About one-third of the prenatal supervision required by expectant mothers in the county was provided. Laboratory service utilized for diagnosis of disease in the county was about one-third of the amount necessary. Popular health instruction was inadequately supervised.

The defects in many of the services were those of quantity rather than quality, They may be remedied, therefore, in part by extension of the personnel of the department, especially of its nursing staff.

The problem of provision of clinic facilities for Shelby county residents can be solved by the co-operation of the Memphis and Shelby county health departments. The clinic facilities of the Memphis General hospital should be extended to provide for county patients, who are now cared for only at the tuberculosis clinic.

The control of tuberculosis, which is an important health service in both Memphis and Shelby county, should be carried on by a plan jointly formulated by the Memphis and Shelby county health departments.

Procedure for the control of communicable disease in the county should be changed to agree with the control practices recommended by the Tennessee state department of health. The availability of laboratory service in Memphis would seem to require laboratory release of county cases of typhoid fever and diphtheria. Diphtheria control should

be improved by increasing the immunizations of white and colored children of preschool age.

Provision should be made for the annual medical examination of children in certain grades of the colored schools.

Supervision of expectant mothers, infants and preschool children should be given by nurses at conferences held at specified centers in the county during the winter months. The high neonatal and maternal mortality rates indicate the need for strict control of midwife practice.

Improvement of the milk supply should be secured by intensive supervision of "one cow" dairies by the Shelby county health department in co-operation with the Memphis health department.

Organization and Personnel.

The Shelby county health department administered its activties in 1929 through the divisions of epidemiology, child hygiene and sanitation. Its public health nursing service was administered by the director of the division of child hygiene, through a supervisory nurse.

The staff of the department in 1929 consisted of 15 full-time and two part-time employes, as follows:

1 health officer
1 director, division of child hygiene
1 director, division of epidemiology
1 director, division of sanitation
1 nurse supervisor
3 staff nurses
5 sanitary inspectors
1 live stock inspector
1 shop foreman (malaria control)
2 secretaries

The director of the division of epidemiology served on part-time in 1929. The shop foreman who directed mosquito proofing (supported by the state health department) was on the staff for six months in 1929.

The salary of the health officer was paid by the U. S. Public Health Service and the Tennessee state department of health, the latter contributing the major part. The director of child hygiene was supported jointly by the county health department and the county board of education.

The annexation of part of the territory of Shelby county by the city of Memphis in November, 1929, reduced the population of the county by 36,354 (census of April 1, 1930). The plan of organization of the Shelby county health department for 1930 may then be based on a population slightly in excess of 50,000.

If the personnel of the health department in 1929 had been adequate for the needs of the former county popula-

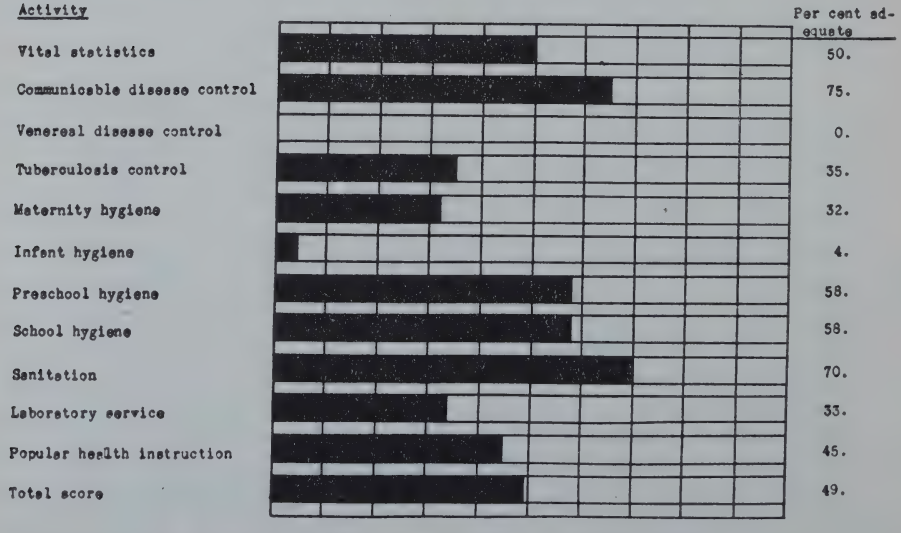
tion, reduction in the staff could have been made in 1930. But the present survey indicates that there was marked inadequacy in several activities, particularly in the nursing supervision of maternity and childhood. Thus, notwithstanding the decrease in the population, increase in the nursing staff of the county health department must be recommended if its health services are to meet the demands of standard practice.

On the assumption that the health needs of the county resemble those of the city of Memphis, it is recommended that the number of staff nurses of the Shelby county health department be increased to ten, and that a supervisor of prenatal and infant welfare nursing be added to the staff. Additional clerical assistance should be provided for the nursing staff by the employment of a clerk. The direction of nursing service should be a responsibility to the health officer since this function serves all divisions.

Expenditures for Public Health Work in 1929.

The expenditures of the Shelby county health department in 1929 amounted to $43,421.53, a per capita expenditure of approximately $ .49 on the basis of an estimated population of 89,093. A total of $7,500 in addition was contributed for the work of the Shelby county health department,

APPRAISAL SCORE FOR ELEVEN MAJOR HEALTH ACTIVITIES, SHELBY COUNTY, TENN., 1929*



*Based on Appraisal Form for Rural Health Work, American Public Health Association, 1st edition, 1927

$1,800 by the Shelby county board of education, $600 by the U. S. Public Health Service, and $5,100 by the Tennessee state department of health. The total health expenditures from official sources thus amounted to $50,921.53 in 1929, a per capita expenditure of $.57.

Cost of an Adequate Health Service.

The employment of the additional personnel recommended for 1930 will increase the expenditures for salaries by $13,320 and cost of maintenance by $1,500 (estimated). The total budget for 1930 will, thus, be increased to $58,241 or approximately $1.10 per capita.

VITAL STATISTICS

By the definition of the U. S. Bureau of the Census, urban areas include all places having 2,500 inhabitants or more, the remainder of the country being designated as rural. On the basis of this definition, Shelby county, ex-exclusive of the city of Memphis, is a rural county. There are 17 villages in the county, but most of these have a population below 1,000*.

In the census of April 1, 1930, the population of Shelby county was found to be 52,739 (preliminary release). In November, 1929, the city of Memphis had annexed part of the territory of the county, having a population of 36,354 on April 1, 1930. Thus, the population of Shelby county as of July 1, 1929, was between 85,000 and 90,000.

In the decade 1900-1910, the population of Shelby county increased from 51,237 to 60,334. In the following decade, its population increased by approximately 500, its population by the census of 1920 being reported as 60,865. Thus, the rate of increase of the population in the past two decades appears to have been greatly exceeded in the present, the population having increased by approximately 28,000 between 1920 and 1929 (prior to the annexation of county territory by the city of Memphis). The great increase of the population of the county in the present decade reduces markedly the accuracy of the intercensal estimates of population for 1920 to 1929, based on previous enumerations of the population. These estimates, as computed by the Tennessee state department of health, are shown in Table II.

(*) The preliminary enumeration of the population of several of these villages in the census of 1930 was reported as follows: Arlington, 446; Bartlett, 429; Collierville, 1,006; Germantown, 322; Millington, 662; Ellendale, 420; Brunswick, 196.

TABLE II.

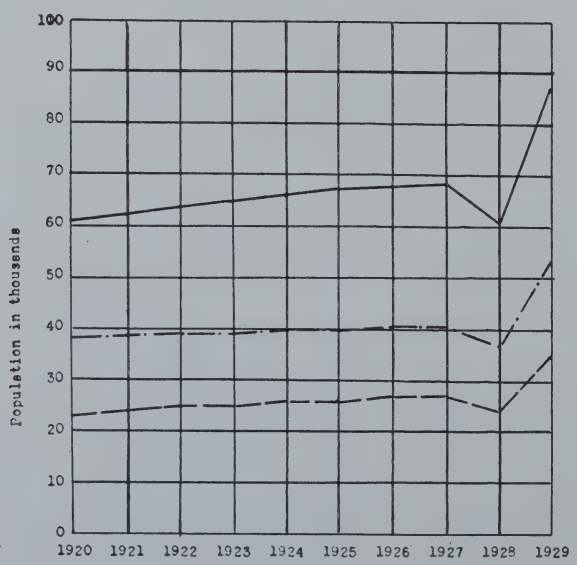
Population of Shelby County, 1920-1929, and Estimates for 1921-1929 as of July 1st, Compared by the Tennessee State Department of Health.

Year	POPULATION		
	Total	White	Colored
1920a	60,865	23,083	37,781
1921	62,470	23,998	38,472
1922	63,537	24,608	38,929
1923	64,605	25,218	39,387
1924	65,669	25,830	39,839
1925	66,685	26,408	40,277
1926	67,800	27,000	40,800
1927	68,400	27,100	41,300
1928	60,826	24,088	36,738
1929b	87,540	34,857	52,683

(a) Census of January 1, 1920.
(b) Presumably based on the results of the census of 1930.

The estimate of the population for 1929 has been made, presumably, since the census of 1930, and represents an accurate estimate. Comparison of the estimate for 1929 with that for the preceding year, which was calculated on the

POPULATION BY COLOR—SHELBY COUNTY, TENN., 1920-1929



Based on figures from Tennessee State Department of Health

basis of preceding census enumerations, indicates the extent of understatement of the latter.

The birth and death rates of Shelby county for the period 1921-1929, calculated by the Tennessee state department of health, have been based on the population estimates shown in Table II. These rates are, therefore, necessarily inaccurate for every year of this period except 1929, when the population estimates were satisfactory. The birth and death rates of Shelby county for the period 1921-1928 are presented in the appendix for reference, but no interpretation of these rates is made because of their obvious inaccuracy.

The total birth rate of Shelby county in 1929 was 11.4, that of the white population being 12.6, and of the colored population, 10.5. The death rate from all causes in 1929 was 13.4, the rate of the white population being 10.3, and that of the colored population, 15.4. The rates for 1929 indicate that the white population of Shelby county is maintaining itself with a slight excess of births over deaths, while the colored population is dying at a rate well above its rate of reproduction.

Specific Mortality Rates.

The five leading causes of death among the white population of Shelby county in 1929 were diseases of the heart (132.0 per 100,000 population), tuberculosis, all forms (114.8), cerebral hemorrhage (86.1), cancer, all forms (63.1), and chronic nephritis (51.6). If the deaths from tuberculosis be corrected for deaths of white residents of Memphis occuring in Shelby county (at the Oakville Tuberculosis Sanatorium), the death rate from tuberculosis, all forms, becomes 60.3, and tuberculosis becomes fourth in importance as a cause of death among the white population of the county.

The leading causes of death among the colored population of Shelby county in 1929 were tuberculosis, all forms, (263.8 per 100,000 population), diseases of the heart (231.6), cerebral hemorrhage (93.0), lobar pneumonia (81.6), and chronic nephritis (55.0). If the tuberculosis death rate of the colored population of Shelby county be corrected by excluding deaths of colored residents of Memphis occuring at the Oakville Tuberculosis Sanatorium, the tuberculosis death rate for the colored population is reduced from 264 to 146 per 100,000 population. The tuberculosis death rate of the colored population, corrected for residence, thus is displaced by diseases of the heart as the leading cause of death among the colored population of Shelby county.

Lobar pneumonia, with a death rate of 81.6, is an important cause of death among the colored population of

Shelby county, but is less important among the white population, which had a death rate from lobar pneumonia of 48.8 in 1929. A similar excess of the colored over the white death rate from this disease was noted for the city of Memphis.

In comparison with the death rates of the city of Memphis, the death rates from tuberculosis among both white and colored populations of Shelby county are low. The death rate from tuberculosis among the colored population in Shelby county in 1929 was less than half that of the colored population of Memphis. Nevertheless, the death rate from tuberculosis among the colored population of the county is high, being over twice as great as the death rate of the white population in 1929.

Deaths from violence, which form a leading cause of death among the white and colored population of Memphis, are relatively unimportant as a cause of death in Shelby county.

Infant Mortality.

Infant mortality rates, being based on births, instead of population, may be accepted as calculated for the period 1922, 1929 by the Tennessee state department of health.* These rates are given in Table III.

TABLE III.
INFANT MORTALITY RATES, BY COLOR
SHELBY COUNTY, 1922-1929

Year	Live Births			Infant Deaths under one year			Infant Mortality Rate(a)		
	Total	White	Colored	Total	White	Colored	Total	White	Colored
1922	1,020	532	488	94	24	70	92.2	45.1	143.4
1923	959	476	483	99	28	71	103.2	58.8	147.0
1924	1,101	584	517	110	23	87	99.9	39.4	168.3
1925	1,070	582	488	102	26	76	95.3	44.7	155.7
1926	1,536	796	740	124	42	82	80.7	52.8	110.8
1927	1,066	535	531	108	25	83	101.3	46.7	156.3
1928	1,067	491	576	77	17	60	72.2	34.6	104.2
1929b	994	440	551	85	13	72	85.5	29.5	130.7

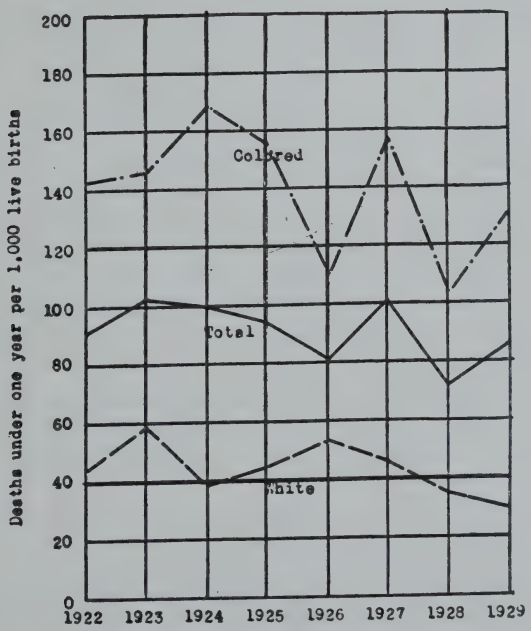
(a) Infant deaths under one year per 1,000 live births.
(b) Includes three deaths in which color was unspecified.

The mortality rate of white infants of Shelby county is very favorable in each year of the period 1922-1929. Among colored infants the mortality rate is excessive, being on the average between three and four times as high as the rate for white infants. Further examination of the infant deaths

(*) Slight errors in the rates published in 1929 have been corrected.

reveals the fact that the same favorable mortality rate prevails among white infants in the first month of life, the neonatal mortality rate of white infants in Shelby county having been below 25 per 1,000 live births in six of the eight years between 1922 and 1929. The neonatal mortality rate of colored infants of the county has varied between 38.0, the minimum rate, and 73.5, the maximum rate, in the period 1922-1929. In four years of this period, the neonatal mortality rate of colored infants exceeded 50 per 1,000 live births.

INFANT MORTALITY BY COLOR, SHELBY COUNTY, TENN., 1922-1929



A possible explanation of the difference in the chance of survival of white and colored infants in Shelby county is found in a comparison of the prevailing method of delivery of both groups. This is shown in Table IV.

TABLE IV.

BIRTHS, BY COLOR AND ATTENDANT AT DELIVERY
SHELBY COUNTY, 1922-1929

Year	Number of Live Births			Per Cent of Live Births(a) Attended by Physicians			Attended by Midwives		
	Total	White	Colored	Total	White	Colored	Total	White	Colored
1922	1,020	532	488	68.5	95.5	39.1	31.4	4.5	60.7
1923	959	476	483	65.5	93.7	37.7	34.3	6.1	62.1
1924	1,101	584	517	65.2	(b)	(b)	34.6	(b)	(b)
1925	1,070	582	488	78.5	(b)	(b)	21.3	(b)	(b)
1926	1,536	796	740	72.1	95.2	47.3	27.8	4.8	52.6
1927	1,066	535	531	68.1	92.9	43.1	31.8	7.1	56.7
1928	1,067	491	576	58.9	94.9	28.1	40.8	4.9	71.5
1929	994	440	551	66.2	96.4	41.8	33.6	3.4	57.7

(a) A group of births, comprising less than 0.5 per cent of the total, in which the attendant was unspecified, is not included.
(b) Data not available.

The majority of white infants, but less than half of the colored infants of Shelby county are delivered by physicians. The midwife, who plays a negligible part in the delivery of white infants, delivers more than half of the colored infants of the county.

The method of delivery is also of importance in its effect on maternal mortality. The maternal mortality rates of the white and colored population of Shelby county are shown in Table V.

TABLE V.

MATERNAL MORTALITY RATES, BY COLOR
SHELBY COUNTY, 1922-1929.

Year	Number of Live Births			Number of Puerperal Deaths			Maternal Mortality Rate(a)		
	Total	White	Colored	Total	White	Colored	Total	White	Colored
1922	1,020	532	488	13	5	8	12.7	9.4	16.4
1923	959	476	483	11	2	9	11.5	4.2	18.6
1924	1,101	584	517	8	1	7	7.3	1.7	13.5
1925	1,070	582	488	10	2	8	9.3	3.4	16.4
1926	1,536	796	740	5	1	4	3.3	1.3	5.4
1927	1,066	535	531	10	3	7	9.4	5.6	13.2
1928	1,067	491	576	9	1	8	8.2	2.0	13.7
1929	994	440	551	9	0	9	9.1	...	16.3

(a) Puerperal deaths per 1,000 live births.

Maternal mortality among white women of the county has been low, on the average, in the period 1922 to 1929, but maternal mortality among colored women has been very high in every year but one.

The high neonatal and maternal mortality rates among the colored population of Shelby county indicate the necessity of prenatal care especially among the colored, and of supervision of care at delivery by control of the midwife.

STATISTICAL PROCEDURE AND ANALYSIS.

Tennessee was admitted to the Death Registration Area in 1917 and to the Birth Registration Area in 1927. It may be assumed, therefore, that birth and death reporting in Shelby county are adequate.

For the purpose of registration of deaths and births, Shelby county, exclusive of Memphis, is divided into five districts, each district having a registrar. Prior to 1929, the registrars sent their birth and death certificates directly to the state department of public health at Nashville. Beginning with 1929, each registrar sent his original certificates to the county health officer who has been made sub-registrar. After copies of these certificates are made, the original certificates are sent to the state department of public health. In order to secure complete reports of births for 1929, the registrars of the county registration districts made personal visits to midwives to obtain reports of births which had not been sent in.

Reports of deaths from tuberculosis, diphtheria, measles, typhoid fever and whooping cough, are checked against reports of cases of these diseases. Deaths under one year and stillbirths are checked against certificates of births and stillbirths.

Very little tabulation of death or birth statistics is done by the Shelby county health department. The total number of deaths by color is determined annually, but there is no annual tabulation of deaths by age or sex. The annual death rates of the ten most important causes of death are not computed. During 1929, monthly records of deaths by cause, color, age and sex were made, but these statistics were not tabulated at the end of each month. There is no annual tabulation of births, nor is the infant rate computed annually. No graphic charts are made to show the trend of the death rates. The annual report, which is mimeographed, lists only the number of births, stillbirths and deaths under one year.

Recommendations.

It is recommended:

(1) That a study of the births and deaths of Shelby county be made annually; that death rates from the principal causes of death, and infant mortality rates be calculated and that other statistical studies be made to assist in the solution of local problems. It seems possible that assistance in such statistical analysis might be obtained from the division of vital statistics of the Memphis health department.

(2) That the registrar of vital statistics of the Memphis health department and the Shelby county health department adopt a reciprocal plan of allocating resident deaths.

(3) That the Shelby county health department employ an additional clerk to assist in the statistical work of the nursing division as well as the current analysis of vital statistics.

COMMUNICABLE DISEASE CONTROL.

The control of communicable disease in Shelby county is under the direction of the division of epidemiology of the Shelby county health department. The director of this division supervises cases of communicable disease very closely, making most of the visits to cases. The reporting of cases of diphtheria, scarlet fever, measles and whooping cough by physicians to the Shelby county health department seems to have been adequate in 1929, although judgment of adequacy is complicated by the fact that there were no deaths from scarlet fever, or measles, and only one death from whooping cough, in 1929. The reporting of typhoid fever cases was below the standard of seven cases per death in 1929, although the low incidence of this disease makes the standard somewhat inapplicable.

Individual case histories are made of typhoid fever, scarlet fever, diphtheria, meningitis and tularemia cases. Data concerning each case are recorded on a card which is filed according to the disease. The essential facts concerning the milk and water supply, exposure to cases, and other epidemiological information, are obtained for each case, but these are not correlated with disease incidence in filing. Spot maps of cases of typhoid, scarlet fever, diphtheria, measles and poliomyelitis, were kept in 1929. There were no cases of smallpox in 1929. No weekly chronological charts of cases of scarlet fever, or diphtheria, are kept, although these charts are kept by month for scarlet fever and diph-

theria. (The low incidence of these diseases reduces the necessity for weekly charting.)

Diphtheria Control.

Diphtheria cases are released without the taking of cultures. This practice is justified by the director of epidemiology on the basis of a provision in the Tennessee "regulations governing communicable diseases" which states that in the absence of laboratory facilities diphtheria cases may be released 16 days after onset. This provision would not seem to apply in Shelby county, however, since the laboratory serving West Tennessee is located in Memphis and is, therefore, available for the examination of cultures from Shelby county. Antitoxin is available to physicians for all indigent cases, and toxin antitoxin, which is purchased by the Shelby county health department, is distributed free to physicians for immunization of indigents.

The number of diphtheria immunizations of preschool children was inadequate in 1929. It is necessary that at least 20 per cent of the preschool population be immunized annually if children of preschool age are to be protected against diphtheria, but only five per cent of the Shelby county children of preschool age were immunized in 1929. Furthermore, this total represents largely immunization of white children. There were almost three times as many immunizations of children of school age, however, as is necessary to protect the school population on the basis of standard practice, which requires the immunization of ten per cent of the elementary school population annually. While a smaller percentage of immunizations was made among colored than among white children, the number of both white and colored school children immunized exceeds the standard. It seems possible, then, that the deficiency in immunization of preschool children is somewhat balanced by the large number of immunizations of school children.

Typhoid Control.

Negative cultures from stool and urine of typhoid cases are not required before their release. This is in accordance with a provision of the Tennessee "regulations governing communicable diseases," which states that in the absence of laboratory facilities, typhoid cases may be released without cultures. This exception, as in the case of diphtheria control, would not seem to apply to Shelby county. No laboratory examinations are made routinely to detect carriers either among typhoid cases or among milk and foodhandlers. Typhoid vaccine, which is received free from the state department of health, is distributed free.

A total of 10,108 persons were immunized against typhoid fever in 1929. This number is exactly 14 times the standard number required, on the basis of 100 persons immunized for each typhoid death. It would seem that the intensity of the typhoid immunization program might now be reduced since typhoid control by improved sanitation has been more nearly perfected. About one-half of the county population now uses a protected water supply, and about three-fourths use sanitary methods of sewage disposal.

Smallpox, Scarlet Fever, Ophthalmia Neonatorum Control.

Smallpox vaccination is compulsory for school attendance in Shelby county, thus making the control of smallpox comparatively simple. Susceptible contacts to smallpox cases are vaccinated. Smallpox vaccine, which is purchased by the county health department, is distributed free to physicians. The total number of persons vaccinated by the county health department in 1929 was 9,056, or ten per cent of the total population, a figure which exceeds the number of vaccinations required by standard practice.

All child contacts to scarlet fever cases are quarantined unless they are taken into a home where there are no children. If they show no symptoms after seven days of quarantine, they are released. There is no provision for the medical treatment of cases of ophthalmia neonatorum, although nursing service was given to these cases in 1929. No cases of ophthalmia neonatorum were reported by physicians to the county health department in 1929. The state department of public health distributes silver nitrate for the treatment of cases of ophthalmia to physicians and midwives of the county.

Visits to Cases of Communicable Disease.

Records of the number of visits to cases of communicable disease in Shelby county are incomplete. Most of the visits recorded in 1929 were made by the director of the division of epidemiology. The number of visits made to cases of diphtheria, typhoid fever, and scarlet fever was very slightly below the standard for each of these diseases. Thus, there were 108 cases of diphtheria reported in 1929. These should have received 324 visits, but the number of visits made to diphtheria cases by the health department was 295. In the case of typhoid fever, 27 cases were reported. On the basis of three visits per case, 81 visits should have been made to these cases; actually 66 visits were made to typhoid fever cases. There was a similar slight deficiency in visits to scarlet fever cases. Visits to measles and whooping cough cases, few of which were reported in 1929, exceed the stan-

dard. No cases of poliomyelitis or cerebrospinal meningitis were reported in 1929.

Diagnostic Service.

The health department maintains a diagnostic service for the assistance of physicians, but no record was kept of the number of consulting calls made in 1929.

Hospitalization.

Very few cases of communicable disease from Shelby county were hospitalized in 1929. Hospitalization of typhoid and diphtheria cases is very inadequate, only one case of these diseases having been hospitalized in 1929. The number of scarlet fever cases hospitalized appears to have been adequate by the standard requiring that five per cent of these cases be hospitalized.

Recommendations.

It is recommended:

(1) That the number of diphtheria immunizations of white and colored children of preschool age be increased.

(2) That the procedure of the Shelby county health department in regard to the release of diphtheria and typhoid fever cases from quarantine be made to conform to the regulations of the Tennessee state department of health in regard to control of communicable disease; that release of diphtheria cases be made only after obtaining two negative nose and throat cultures taken at least 24 hours apart and 12 days after onset; that, in the case of typhoid fever, patients be released only after one negative specimen of urine and feces has been secured; that laboratory control be extended to potential carriers.

(3) That a greater number of cases of typhoid fever and diphtheria be hospitalized.

(4) That the proportion of visits to communicable disease cases made by the communicable disease nurse be increased so that the director of the division of epidemiology may devote more time to epidemiological study.

(5) That the nursing division keep accurate records of nursing visits to all communicable diseases.

VENEREAL DISEASE CONTROL.

The state act concerning the reporting of venereal disease requires that "every physician . . . . who makes a diagnosis in or treats . . . . a case of venereal disease . . . . shall report such case to the municipal or county health officer having jurisdiction . . . " Notwithstanding this legal pro-

vision reporting of cases of venereal disease to the county health department seems to be incomplete.

Clinical Service.

A small number of cases of venereal disease from Shelby county are treated at the venereal disease clinic of the Memphis General hospital and the Memphis health department. The clinic records do not distinguish between city and county patients, however, and it is, therefore, impossible to determine the attendance of county patients.

The complete lack of records concerning venereal disease cases and their treatment in Shelby county makes it seem that very little is done in this field of public health work.

Recommendations.

It is recommended:

(1) That the physicians of the county be reminded of the state act requiring the reporting of cases of venereal disease to the county health officer.

(2) That the venereal disease clinic of the Memphis General hospital and the Memphis health department definitely provide for the treatment of county patients, the county health department to assume responsibility for the additional clinic expense.

(3) That the records of the venereal disease clinic be so tabulated that data concerning city and county cases treated may be studied separately.

TUBERCULOSIS CONTROL.

The tuberculosis control program in Shelby county is directed by the director of the division of child hygiene of the county health department and by the Shelby County Tuberculosis and Health Society. In 1929, there occurred in Shelby county a total of 98 deaths from tuberculosis, including pulmonary and other forms. This figure is exclusive of the deaths of 81 Memphis residents occurring in the Oakville Tuberculosis Sanatorium which were reported to the district registrar and are usually included in the total tuberculosis deaths of Shelby county. Seventy-seven new cases of tuberculosis were reported to the county health department in 1929. Thus, slightly less than one case per death was reported, whereas adequate reporting requires that at least two new cases per death shall be reported.

Field Nursing Service.

The total number of visits made to tuberculosis cases in Shelby county by nurses of the county health department and the Shelby County Tuberculosis Society in 1929 was 687,

only a third of the number necessary to provide adequate nursing service for these cases. About 11 per cent of these visits were made to postsanatorium cases, which is about two-fifths of the number required for their adequate nursing supervision.

Clinical Service.

The Shelby county health department co-operates with the Memphis health department and the Memphis General hospital in the operation of the tuberculosis clinic, which is held twice a week at the Memphis General hospital. The director of child hygiene of the Shelby county health department and a nurse from the nursing division attend this clinic regularly. The physician shares the medical work of the clinic, and the nurse interviews county patients and obtains information which will assist her in follow-up visits to cases discovered. The director of child hygiene of the county health department estimates that 200 county cases were examined at this clinic in 1929. (The director of nursing service of the Memphis health department estimates this number to be only 125.) The 77 positive cases discovered in this clinic in 1929 were estimated to have made about three clinic visits per case.

The director of child hygiene of the county health department held 24 clinics in the county in 1929 for the examination of tuberculosis suspects and contacts. It is estimated that 311 examinations were made at these clinics. In addition, this physician makes annual examinations of all county teachers for tuberculosis. In 1929, 464 teachers were examined for tuberculosis and reports on the findings were made to the county superintendent of schools. These examinations include both colored and white teachers. If one-fifth of the examinations of teachers be added to the visits made to tuberculosis clinics (assuming that one-fifth of these may be considered contacts or suspects), then the number of visits made by county cases to tuberculosis clinics in 1929 is about three-fourths of the number required for clinic supervision of the tuberculous. The number of clinic visits per patient averages about one, although it is estimated that the positive cases made an average of three visits.

Hospitalization.

Shelby county shares with the city of Memphis the financial support of the Oakville Tuberculosis Sanatorium and the privilege of hospitalization of tuberculous cases therein. Forty-two cases of tuberculosis from Shelby county were hospitalized in 1929. These cases included one child under 15 years of age. The total number of patient days

of Shelby county cases is estimated to be 6,000.* This is less than half the number of patient days which would indicate adequate hospitalization of county cases. The majority of cases hospitalized are moderately and far advanced.

Institutional Care of Tuberculosis Contacts.

Shelby county has no open air school or specially conducted open air classrooms for tuberculosis contacts or children who are physically below normal. The preventorium at Cheerfield Farm is open to Shelby county children, who are admitted after examination by the physician of the Shelby County Tuberculosis Society. Five children were admitted from Shelby county in 1929, their average length of stay being one year.

County children also attend the summer camps conducted by the Shelby County Tuberculosis Society. Fifteen county children were in attendance at these camps for two months in 1929. The provision for tuberculosis contacts and physically subnormal children in the county is less than one-fifth that required if children of this group are to be adequately cared for.

The county health department has no record of the names of tuberculous cases visited in 1929.

Recommendations.

It is recommended:

(1) That the director of epidemiology of the Shelby county health department reorganize and extend the tuberculosis program in Shelby county in consultation with the director of tuberculosis of the Memphis health department.

(2) That the attendance of a greater number of county patients at the tuberculosis clinic in Memphis be secured and more frequent visits to the clinic be urged.

(3) That the nursing service for the tuberculous be increased in volume and frequency of visits per case.

(4) That the hospitalization of a larger number of cases of tuberculosis from Shelby county be secured by increasing the beds in the Oakville Tuberculosis Sanatorium.

(5) That facilities for the care of tuberculosis contacts and children physically below normal be improved by the establishment of open air classrooms in county schools and by increasing the facilities of the county and city preventorium.

(*) The actual number of patient days for county cases was 5,367 for 11 months of 1929. The figures for one month, which were not available, were estimated to be 633 patient days, thus bringing the total for the year 1929 to 6,000 patient days.

PRENATAL HYGIENE.

The direction of the program for the hygiene of maternity, infancy and childhood in Shelby county is under the division of child hygiene of the county health department. The medical director of this division is assisted by the nursing division, which gives nursing service in a generalized nursing program.

Nursing Service.

In 1929, there were 1,179 births in Shelby county. These included 1,155 live births and 24 stillbirths. Only 58 prenatal cases were supervised by the nursing service of the Shelby county health department in 1929. Adequate prenatal nursing supervision requires that at least 25 per cent of the prenatal cases be under the supervision of the nursing service of the health department, but the Shelby county health department gave nursing supervision to only about five per cent of the prenatal cases in 1929.

Clinical Service.

There is no clinical service available for Shelby county prenatal cases. A small number of cases attend the prenatal clinic of the Memphis health department and the Memphis General hospital, although an attempt is made to limit this clinic to city cases.

Obstetrical Service.

It is estimated that about 500, or 42 per cent, of the births occurring to residents of Shelby county in 1929, were delivered in Memphis hospitals. This estimate is based on the experience of two months. Thus, 46 births to Shelby county residents occurred in Memphis hospitals in January, 1929, and 40 in July, 1929, and it seems safe to consider these months typical. The number of births delivered by midwives in 1929 was not available in the records of the county health department.

The Shelby county health department issued permits to 84 midwives in 1929. The director of the division of child hygiene of the county health department and the county nurses held midwives' classes at six centers in the county. There were nine meetings in 1929 with an average attendance of 12 to 16 per meeting, and seven midwives completed the course. The nurses also visit the midwives in their homes.

Recommendations.

It is recommended:

(1) That the nursing service to prenatal cases in Shelby county be increased.

(2) That the Memphis health department and the Memphis General hospital be requested to extend their prenatal clinic facilities to Shelby county patients.

(3) That the itinerant clinics for infants and preschool children held in the county schools in the summer months also offer medical supervision to prenatal cases, and that nursing conferences be held at these centers at regular periods during the winter.

INFANT HYGIENE.

Nursing Service.

Only 54 infants of the 1,155 who were born alive in Shelby county in 1929 were visited by the Shelby county health department nurses in that year. A total of 154 visits made to these infants were recorded. This figure is considered incomplete by the director of nursing, who estimates that an average of six visits was made to each infant registered. In any case, the volume of nursing visits to infants is very low. If 154 be accepted as the number of nursing visits, the volume of nursing visits to infants was less than one-tenth the number necessary for proper nursing supervision.

Clinical Service.

There are no well-baby clinics or nurses' conferences open for regular supervision of infants throughout the year in Shelby county. From May to October, itinerant clinics are held weekly for infants and preschool children in 24 schools in the county, by the director of the division of child hygiene of the county health department. It is estimated that 34 infants were examined at these clinics in 1929. Each of these infants over six months of age made at least three visits, since all infants over six months of age were immunized against diphtheria, which requires at least three visits for the three doses of toxin antitoxin. The number of clinic visits made by infants under one is about three per cent of the number necessary to provide adequate clinical supervision of infants.

Recommendations.

It is recommended:

(1) That nursing service to infants be increased.

(2) That the itinerant clinics aim to increase the attendance of well infants, and that these infants receive supervision in the winter months at conferences held by nurses of the county health department.

PRESCHOOL HYGIENE.

Nursing Service.

There were 177 children of preschool age registered with the nursing service of the county health department in 1929. Four hundred and twelve visits were made to these children, affording this group nursing supervision which is about 44 per cent adequate.

Clinical Service.

Itinerant clinics for the examination of infants and preschool children were held at 24 white schools in the county from May to October, 1929. Five hundred and eight white children of preschool age were registered at these clinics, and made a total of at least 3,048 visits. All children were given a physical examination, immunized against diphtheria and typhoid fever, and vaccinated. Thus, each child made at least three visits for toxin antitoxin immunization, and three additional visits for typhoid vaccination. It seems probable, therefore, that each child registered made an average of six clinic visits. Parents are required to be present at the examinations of preschool children. No preschool conferences under nursing direction were held in the county.

Recommendations.

It is recommended:

(1) That nursing service to preschool children in Shelby county be increased.

(2) That nurses' conferences for preschool children (open also to prenatal cases and infants) be held during the winter months at the centers at which the itinerant clinics are held.

SCHOOL HYGIENE.

Health Examination.

The director of the division of child hygiene of the county health department directs the school hygiene work in Shelby county. In 1929 he examined 9,024 white children in the elementary schools. In the preceding year, over 3,000 colored children were examined, and re-examinations of these children will be made in 1930. No examinations of colored school children were made, however, in 1929. The physical examniation is made at the rate of six children per hour, which allows time for a careful examination. The nurse tests vision and weighs and measures the children be-

fore they are sent to the physician for examination. The physician tests hearing by the whisper test.

The total number of school children examined in 1929 exceeds by 13 per cent standard practice, which requires the physical examination of 30 per cent of the elementary school population annually. The program for the health examination of school children is inadequate, however, since examinations of colored children are not made annually.

Parents are invited to be present at the physical examinations in only a small number of schools. In 1929, only 20 parents were present at the examinations of school children.

In 1929, the nurses made inspections of 17,854 school children to note the presence or absence of the vaccination scar.

Nursing Service.

A measure of the adequacy of nursing follow-up of school children having defects is available in the number of defects reported corrected. Few corrections of defects discovered in Shelby county school children were made in 1929. Thus, standard practice assumes that ten per cent of the grade school population will require filling of teeth annually. Only 4.5 per cent of the Shelby county school children had teeth filled in 1929. An average of 30 per cent of the grade school population should have teeth cleaned annually; only 4.5 per cent of the county school population had teeth cleaned in 1929. The number of extractions, however, was in excess of the number usually made.

It is expected that 25 per cent of the grade school population will require operations on tonsils and adenoids; 18 per cent of the Shelby county school children had tonsils or adenoids removed in 1929. No record is kept of children with heart or lung defects who were placed under the care of physicians. One hundred fifty-two children were referred to an oculist, but no record was made of the number of these children fitted with glasses.

The small number of defects corrected may be attributed in part to the deficiency in follow-up nursing service to school children, since only about one-fourth the number of visits required for adequate nursing service to school children was made in 1929. The correction of defects among indigent county children is made difficult by the necessity of seeking clinic service in Memphis.

Health Control.

All county school children are weighed at the time of their annual physical examination. In 1929, all white school

children given physical examinations were weighed, but no colored children were weighed since medical examinations of colored school children were not made in 1929. Parents are notified of the weight of the child once a year; if the child is below normal weight, the nurse makes a home visit. Underweight children are weighed weekly. They are placed in nutrition classes directed by the students of home economics, which are used as a practical demonstration in health education.

A course of study in health has been formulated for the elementary grades of the Shelby county schools. This course of study is to be revised in 1930. An average of 150 minutes is devoted to instruction in health in each elementary grade. A text book in health education is recommended for all grades and a special text has been adopted for general use. Instruction in physical education is included in the course of study of health. The outdoor recess period of 30 minutes daily is under the direction of the teachers.

Sanitation of School Buildings.

An annual inspection of the school buildings of the county is made by a member of the division of sanitation in the county health department, the results being reported to the county board of education, with recommendations for improvement. In 1929, 30 white schools and 68 colored schools were inspected. In the inspection, particular attention is given to sewage disposal and the water supply, but additional inspection is made of drinking and lavatory facilities, heating, ventilation, lighting, playgrounds, condition of buildings, furniture, and blackboards. As a result of the 1929 inspections, it was found that all white schools were provided with a safe water supply and sanitary method of sewage disposal. Less than half of the colored schools were provided with a safe water supply and slightly less than two-thirds had a sanitary method of sewage disposal. During 1929, 22 schools were improved by the installation of sanitary privies, or the provision of safe water supplies. About three white schools have adequate lavatory facilities, but none of the colored schools are so equipped. About three-fourths of the school rooms are provided with thermometers, and one-tenth have adjustable seats.

Recommendations.

It is recommended:

(1) That an adequate program of physical examinations be provided for colored school children.

(2) That a greater number of corrections of defects among school children be secured by intensifying the school

nursing program, urging attendance of parents at the physical examinations, and obtaining the co-operation of classroom teachers in the follow-up of defects.

(3) That safe water supplies, sanitary fly-proof pit privies and adequate lavatory facilities be provided for the colored schools not so equipped.

SANITATION, FOOD AND MILK CONTROL, WATER AND SEWERAGE.

The division of sanitation of the county health department is responsible for general sanitation, food and milk control, supervision of the water supply and sewage disposal. The staff of this division consists of the director of the division and four inspectors. There is an additional staff of two foremen and 12 laborers engaged in malaria control work. In 1929, a total of 10,716 sanitary inspections was made. These included inspections of dairies and private dwellings to secure the installation of sanitary privies and safe water supplies, a few inspections of mosquito breeding places, and routine house to house inspections. The number of inspections of foodhandling establishments in 1929 was very small and was not recorded. The total number of sanitary inspections made exceeds the number necessary for adequate sanitary supervision in the average county.

Intensive malaria and mosquito control measures were conducted during 1929 in the suburban territory surrounding Memphis and in 21 communities in the county. The work consisted of oiling mosquito breeding places and the application of Paris green and slaked lime to areas which could not be oiled. Ditches were dug to drain areas containing stagnant water and old drains were cleared of obstructions.

The county health department, in co-operation with the U. S. Public Health Service, has developed a plan for screening and mosquito proofing. Screens are manufactured in a factory established by the county health department; during six months of 1929, the state department of public health paid the salary of a skilled foreman to act as supervisor of this factory. For demonstration purposes, 58 farm tenant homes were screened and mosquito proofed in 1929. This is the beginning of a campaign to screen and mosquito proof every home in rural Shelby county.

Another activity of the malaria control program of Shelby county was a malaria survey made in September, 1929. Twenty-four white schools and 57 colored schools were surveyed, blood smears being taken of 3,400 white children and 4,299 colored children. The average percentage of positive blood smears in the white schools was two; the average

in the colored schools was 5.3 per cent. The percentage of positive smears in the white and colored schools together was 3.6. The highest percentage of positive smears in the white schools was 7.9; the highest percentage in the colored schools, 27.3. The malaria control program for Shelby county in 1930 will be based on the findings of this survey.

Foodhandling, Examinations and Control.

The county health department has no program for the supervision of foodhandling establishments. The number of these in the county is not large, since there are no large towns, but some supervision should be provided for the food shops and restaurants in the villages. Only one examination of a foodhandler was made in 1929. A few inspections of foodhandling establishments were made, but no record was kept of the number.

Milk Supply Control.

Shelby county produces a large part of the milk supply of the city of Memphis. The sanitary control of that part of the milk supply of Shelby county which is shipped to Memphis is, therefore, the direct responsibility of the Memphis health department. The Shelby county health department makes no provision for milk control, except tuberculin testing, yet the omission of this service seems to be partially compensated for by the activities in milk control exercised by the Memphis health department in Shelby county. The Shelby county health department should, however, assume responsibility for the sanitary control of the milk supply produced in the county, and consumed raw, much of which is obtained from the "one cow" dairies.

The cows of Shelby county are tuberculin tested every two years, Shelby county being an accredited county under the U. S. Department of Agriculture's plan for the eradication of bovine tuberculosis.

There is no record of the bacterial counts of raw milk, except that portion sold to distributing and pasteurizing plants in Memphis, which is examined by the laboratory of the Memphis health department. No bacteriological examinations of the milk produced by one cow dairies are made. The proportion of the milk supplied to Shelby county by this type of dairy is not known. It is estimated that the majority of the population of the suburban territory of Memphis uses pasteurized milk.

Following its dairy inspections in Shelby county, the Memphis health department reports to the county health department the names of dairies having insanitary water

supplies and sewage disposal systems. As a result of these notifications, 729 dairy inspections were made by the county health department in 1929, following which 58 dairy farms installed sanitary privies.

Since the Memphis health department supervises that part of the milk supply of Shelby county produced by large dairies, the chief milk control problem of the county health department is the supervision of the one cow dairy.

Water Supply.

About 45 per cent of the population of Shelby county is supplied with water of known satisfactory sanitary quality. The county may be divided into three areas: First, the strictly rural area; second, the suburban territory which has recently been annexed to the city of Memphis; third, five incorporated villages with populations between 300 and 1,000. The rural territory is served by wells, 34 per cent of which are protected. Three-fifths of the population of the suburban territory is connected with the public water supply of the city of Memphis; the wells used by the additional population are not protected. Four of the incorporated villages use water from artesian wells, or from protected wells of other types. The water supplies of these villages are examined monthly and meet the standards of the U. S. Treasury Department. The fifth incorporated village has a supply which comes from protected wells in only 29 per cent of its dwellings.

Sewage Disposal.

About 50 per cent of the dwellings of the rural territory of Shelby county have fly proof privies, and about ten per cent, septic tanks. A small proportion of the population of the suburban territory, about 14.5 per cent, is connected with the sewarage system of the city of Memphis. Eighty-four per cent of the population of this suburban territory is served by fly proof privies. In the incorporated villages a percentage of the population, varying from eight per cent in Arlington to 62 per cent in Collierville, is connected with public sewerage systems. An additional percentage of the population varying from 12 to 50 per cent is served by fly proof privies. The average percentage of the population of the incorporated villages having safe systems of sewage disposal is 53. It is estimated, then, that about 74 per cent of the population of the county is served by a sanitary method of sewage disposal.

Recommendations.

It is recommended:

(1) That sanitary supervision of foodhandling establish-

ments in the villages of the county, and of the health of foodhandlers, be undertaken by the county health department.

(2) That a survey be made to locate the "one cow" dairies and that these dairies be placed under the joint sanitary control of the Memphis and Shelby county health departments.

(3) That the Memphis health department transmit to the Shelby county health department copies of all data relating to the sanitary condition of dairies and the bacterial content of milk produced in Shelby county.

(4) That a campaign to secure protected wells and sanitary privies for all rural homes be conducted in connection with the screening campaign.

LABORATORY SERVICE.

Shelby county receives its laboratory service from the West Tennessee Laboratory, which is operated as part of the laboratory of the Memphis health department. A total of 1,110 laboratory examinations were made for Shelby county by this laboratory in 1929.

The diphtheria examinations were insufficient to give adequate diagnostic service for diphtheria cases and contacts in Shelby county. Only about one-third of the number of typhoid examinations required for adequate laboratory diagnosis and control was made in 1929. The number of tuberculosis specimens examined was incompletely reported, since the laboratory of the University of Tennessee Medical School, which examines the sputum of cases from the tuberculosis clinic, does not classify these specimens by source (that is, city or county). Only 27 examinations of tuberculous sputum of county patients were reported in 1929.

The number of cases of venereal disease occuring in Shelby county in 1929 was not reported. On the basis of the population it is estimated that there should have been about 460 cases of syphilis and 230 cases of gonorrhea. The laboratory diagnosis of syphilis and gonorrhea, in relation to the number of cases estimated to have existed in the county, is very inadequate, being about one-sixth of the required number for adequate laboratory diagnosis of syphilis and a little less than one-third for gonorrhea.

Only about one-fourth of the water supply of Shelby county receives monthly examinations. The actual number of examinations of county water supplies made by the laboratory in 1929 was 25.

Recommendation.

(1) It is recommended that the diagnostic laboratory

service provided for Shelby county by the West Tennessee Laboratory in Memphis be increased. (The adoption of standard practices for the control of diphtheria and typhoid fever, recommended in the section on communicable disease control, will automatically increase the demand for laboratory diagnosis of these diseases.)

POPULAR HEALTH INSTRUCTION.

The Shelby county health department distributes pamphlets explaining the method of building sanitary privies, a set of pamphlets describing various types of protected wells, and a bulletin entitled "Screening for Malaria Control." In addition to this original literature, the pamphlets of the John Hancock and Metropolitan Life Insurance Companies, and the Shelby County Tuberculosis Society, are distributed although no record was made of the number of these pamphlets distributed in 1929. The supply of the life insurance bulletins was low at the time the survey was made. It was reported that the bulletins relating to sanitation were distributed systematically, but that the other bulletins were distributed only casually, and in small numbers.

Monthly reports of the work of the Shelby county health department were made in 1929 according to a form outlined by the state department of public health. These reports were typewritten and were confidential, being distributed only to members of the department and the state department of public health. The county health department has no record of newspaper publicity during 1929, although the newspapers give space to the activities of the department.

The director of the division of child hygiene gave 24 lectures to parent-teacher associations in 1929. In addition, this director gave talks to teachers in 24 white and ten colored schools, the subjects discussed being symptoms of communicable disease and health habits. The director of child hygiene also gave a course of 36 lectures on child hygiene to the teachers in training at the West Tennessee State Normal School. Additional lectures were given by the health officer, but no records of these are available.

No use of motion pictures for health education was made in 1929. An extensive motion picture program was carried on in 1926, 1927 and 1928, and it was thought that the novelty of this medium had been exhausted in 1929.

The county health department prepares an annual exhibit for the "Tri-State Fair."

Recommendations.

It is recommended:

(1) That systematic use of education literature on pre-

natal care, child hygiene, and control of communicable diseases be made by the county health department.

(2) That a record of newspaper publicity, and lectures given by the staff be kept by the county health department.

APPENDIX.

TABLE I.

Deaths From All Causes Per 1,000 Estimated Population, By Color, Shelby County, 1922-1929.

Year	Deaths, Exclusive of Stillbirths, per 1,000 Estimated Population		
	Total	White	Colored
1922	15.8	12.3	17.9
1923	16.7	12.2	19.5
1924	15.6	10.2	19.1
1925	16.7	12.0	19.6
1926	16.0	12.6	18.3
1927	16.0	12.6	18.2
1928	17.1	13.1	19.7
1929	13.4	10.3	15.4

Figures from the Tennessee State Department of Health.

TABLE II.

Births Per 1,000 Estimated Population, By Color Shelby County, 1922-1929

Year	Births, Exclusive of Stillbirths, per 1,000 Estimated Population		
	Total	White	Colored
1922	16.1	21.6	12.5
1923	14.8	18.9	12.3
1924	16.8	22.6	13.0
1925	16.1	22.0	12.1
1926	22.7	29.5	18.1
1927	15.6	19.7	12.9
1928	17.5	20.4	15.6
1929	11.4	12.6	10.5

Figures from the Tennessee State Department of Health.

TABLE III.

Death Rates From Important Causes Per 1,000
Estimated White Population,
Shelby County, 1922-1929.

Year	Diseases of the Heart	Violence, all forms	Cancer, all forms	Chronic Nephritis	Tuberculosis, all forms	Cerebral Hemorrhage
1922	134.1	117.8	52.8	77.2	207.2	
1923	122.9	150.7	59.5	83.3	222.1	
1924	104.5	131.6	46.5	100.7	123.9	
1925	151.5	196.9	64.4	87.1	159.0	
1926	159.3	96.3	55.6	70.4	185.2	
1927	177.1	103.3	114.4	77.5	221.4	77.0
1928	195.1	120.4	107.9	54.0	232.5	91.3
1929	132.0	45.8	63.1	51.6	114.8	86.1

Figures from the Tennessee State Department of Health.

TABLE IV.

Death Rates from Important Causes Per 100,000
Estimated Colored Population,
Shelby County, 1922-1929.

Year	Tuberculosis, all forms	Diseases of the Heart	Chronic Nephritis	Cancer, all forms	Violence, all forms	Cerebral Hemorrhage	Lobar Pneumonia
1922	416.1	118.2	113.0	30.8	118.2		
1923	396.1	147.3	121.9	30.5	142.2		
1924	411.7	150.6	82.8	47.7	130.5		
1925	377.4	208.6	121.7	49.7	151.5		
1926	382.4	174.0	71.1	34.3	100.5		
1927	314.8	227.6	133.2	48.4	133.2	87.0	63.0
1928	307.6	236.8	119.8	51.7	106.2	130.5	100.6
1929	263.8	231.6	55.0	28.5	43.7	93.0	81.6

Figures from the Tennessee State Department of Health.

TABLE V.

Death Rates from Tuberculosis per 100,000 Population, by Color, Shelby County, 1922-1929.

Year	Tuberculosis, all forms			Pulmonary Tuberculosis			Tuberculosis, all other forms		
	Total	White	Colored	Total	White	Colored	Total	White	Colored
1922	335.2	207.2	416.1	328.9	207.2	405.8	6.3		10.3
1923	328.1	222.1	396.1	318.8	218.1	383.4	9.3	4.0	12.7
1924	298.5	123.9	411.7	290.9	123.9	399.1	7.6		12.6
1925	292.4	159.0	377.4	278.9	147.6	362.5	13.5	11.4	14.9
1925a	151.4	98.5	183.6	137.9	87.1	167.7			
1926	303.8	185.2	382.4	289.1	177.8	362.8	14.7	7.4	19.6
1926a	162.2	92.6	208.3	147.5	85.2	188.8			
1927	277.8	221.4	314.8	257.3	206.6	290.6	20.5	14.8	24.2
1927a	174.0	132.8	201.0	153.5	118.1	176.8			
1928	277.8	232.5	307.6	256.5	228.3	274.0	21.3	4.2	32.7
1928a	171.1	128.6	198.9	149.7	124.5	166.2			
1929	204.5	114.8	263.8	194.2	109.0	250.5	10.2	5.7	13.3
1929a	111.8	60.3	146.1	100.3	54.5	133.0			

(a) Exclusive of deaths of Memphis residents occurring at the Oakville Tuberculosis Sanatorium, Shelby County.

Figures from the Tennessee State Department of Health, except corrected death rates, 1925-1929.

TABLE VI.

Mortality from the Communicable Diseases of Childhood, Death Rates Per 100,000 Estimated Population, Shelby County, 1922-1929.

Year	Scarlet Fever			Measles			Whooping Cough			Diphtheria		
	Total	White	Colored	Total	White	Colored	Total	White	Colored	Total	White	Colored
1922	25.2	12.2	33.4				25.2	12.2	33.4	9.4	8.1	10.3
1923	4.6		7.6	21.7	23.8	20.3	24.8	7.9	35.5	7.7	7.9	7.6
1924				3.0		5.0	13.7	3.9	20.1	9.1	19.4	2.5
1925	10.5	3.8	14.9	4.5	3.8	5.0	10.5	3.8	14.9	4.5	7.6	2.5
1926	2.9	3.7	2.5	5.9	11.1	2.5	10.3	7.4	12.3	4.4	7.4	2.5
1927	1.5		2.4	1.5		2.4	29.2	22.1	33.9	2.9		4.8
1928			z	z27.9	12.4	38.1	6.6	4.1	8.2	3.3	4.1	2.7
1929							1.1		1.9	5.7	8.6	3.8

Figures from the Tennessee State Department of Health.

SUMMARY OF RATINGS, SHELBY COUNTY, TENNESSEE, (Exclusive of Memphis) 1929a

A.	VITAL STATISTICS (60)			
	1. Registration			
	a.	4	4	
	b.	4	4	
	2. Checking and Verification			
	a.	6	6	
	b.	6	6	
	3. Reporting Efficiency			
	a.	2	2	
	b.	2	2	
	c.	4	4	
	4. Classification and Compilation			
	a.	4	0	
	b.	2	0	
	c.	2	2	
	d.	2	0	
	e.	2	0	
	f.	2	0	
	g.	4	0	
	h.	6	0	
	5. Interpretation and Application			
	a.	4	0	
	b.	4	0	Sec. T 30
B.	COMMUNICABLE DISEASE CONTROL (175)			
	6. Reporting			
	a.	4	2	
	b.	4	4	
	c.	4	4	
	d.	3	3	
	e.	3	3	
	7. Record Keeping			
	a.	10	6	
	b.	6	6	
	c.	6	4	
	Control Practices			
	8. Diphtheria Control			
	a.	2	0	
	b.	3	3	
	c.	3	3	
	9. Typhoid Control			
	a.	3	0	
	b.	3	0	
	c.	3	0	
	d.	3	3	

10.	Smallpox Control			
	a.	3	3	
	b.	3	3	
11.	Scarlet Fever Control	5	5	
12.	Ophthalmia Control			
	a.	2	0	
	b.	3	3	
13.	Visits to Cases			
	a.	5	5	
	b.	5	4	
	c.	4	4	
	d.	2	2	
	e.	2	2	
	f.	2	2	
	g.	2	2	
14.	Diagnostic Service	5	5	
15.	Hospitalization			
	a.	4	1	
	b.	4	0	
	c.	4	4	
	d.	4	4	
16.	Immunization			
	a.	30	15	
	b.	16	16	
	c.	10	10	Sec. T 131

C. VENEREAL DISEASE CONTROL (50)

17.	Reporting	12	0	
18.	Treatment of Cases			
	a.	5	0	
	b.	10	0	
	c.	15	0	
19.	Cases Returned to Physicians or Clinics	8	0	Sec. T 0

(a) Based on Appraisal Form for Rural Health Work, American Public Health Association. 1st Edition, 1927.

D. TUBERCULOSIS CONTROL (100)

20.	Reporting	10	4	
21.	Field Nursing Service			
	a.	20	7	
	b.	5	2	
22.	Clinical Service			
	a.	15	11	
	b.	10	3	

23. Hospitalization			
a.	10	4	
b.	10	0	
c.	5	1	
24. Open-air Class Rooms, Preventoria or Day Camps	15	3	Sec. T 35
E. HEALTH OF THE CHILD (350)			
Health of the Child up to School Age (200)			
Prenatal (75)			
25. Field Nursing Service			
a.	15	3	
b.	15	1	
26. Medical Conferences	25	0	
27. Obstetrical Service			
a.	5	5	
b.	15	15	Sub. T 24
Infant (75)			
28. Field Nursing Service	35	3	
29. Medical Conferences	25	0	
30. Nurses' Conferences	15	0	Sub. T 3
Preschool (50)			
31. Field Nursing Service	10	4	
32. Preschool Conferences			
a.	25	25	
b.	15	0	Sub. T 29
Health of the School Child (150)			
33. Weighing			
a.	3	1	
b.	5	3	
c.	2	2	
34. Physical Exams.			
a.	30	30	
b.	5	4	
c.	5	0	
d.	5	5	
35. Corrections of Defects			
a.	5	2	
b.	3	3	
c.	3	0	
d.	5	0	
e.	8	6	
f.	6	0	
36. Nurses' Visits	5	1	

37.	Nurses' Conferences			
	a.	3	0	
	b.	2	0	
38.	Sanitation of School Buildings			
	a.	2	2	
	b.	13	0	
39.	Health Instruction			
	a.	10	10	
	b.	15	10	
40.	Recreation and Physical Education			
	a.	5	3	
	b.	5	5	
	c.	5	0	Sub. T 87 Sec. T 143

F. SANITATION; FOOD AND MILK CONTROL; WATER; SEWERAGE (175)

41.	Sanitation Inspection Service	30	30	
42.	Foodhandlers Examinations	5	0	
43.	Milk Supply Control			
	a.	30	25	
	b.	30	19	
44.	Water	40	18	
45.	Sewerage	40	30	Sec. T 122

G. LABORATORY (70)

46.	Laboratory Examinations			
	a.	10	4	
	b.	12	4	
	c.	8	0	
	d.	5	1	
	e.	5	0	
	f.	10	10	
	g.	20	5	Sec. T 24

H. POPULAR HEALTH INSTRUCTION (20)

47.	Use of Pamphlets, Etc.			
	a.	4	1	
	b.	3	1	
	c.	5	1	
	d.	3	1	
	e.	3	3	
	f.	2	2	Sec. T 9

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